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TARR AND McMURRY GEOGRAPHIES

SUPPLEMENTARY VOLUME

CALIFORNIA

BY

HAROLD W. FAIRBANKS, PH.D.

AUTHOR OF "STORIES OF OUR MOTHER EARTH," "HOME GEOGRAPHY"
"STORIES OF ROCKS AND MINERALS," ETC.

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PREFACE

THE preparation of a supplementary geography of California involves serious difficulties. No other state in the Union has such a diversity of climate, of physical features, and of products. To furnish in one hundred pages of text a description of the state, its life, and resources which shall be sufficiently broad in scope, and not a mere enumeration of facts, is no easy task. How well the author has succeeded must be left to the teachers and pupils to decide.

In accordance with the plan worked out in the other volumes of the series, the geographic facts are treated in a manner to bring out as fully as possible their causal relations. Facts which under the older methods were grouped together as a mere series to be memorized, are in the supplement discussed as far as possible in their natural relations. Through the interest thus aroused the facts are not only more easily acquired, but also more apt to be retained.

Owing to the marked differences in climate and physiography within short distances, the control which these factors exert over products and industries offers most excellent opportunity for practical study. To the California child geography should naturally become a study of the real world, not of a shadowy book-world.

67446

It has been thought best not to insert review questions at the end of each chapter, partly because of lack of space and partly because they are of doubtful value. In their place there are given at the close of the book both a topical summary and a series of general questions, intended to develop independent thought and to determine whether or not the statements of the text have been understood.

Acknowledgments are due Dr. McMurry, one of the authors of this series, and Dr. F. B. Dressler of the University of California, for helpful criticisms.

For photographs, acknowledgments are due to Professor Branner for the relief map, H. L. Jones for Fig. 49, Spreckels Sugar Company for Fig. 45, Professor Holway for Fig. 27, Sunset Photo. and Engraving Company for Fig. 57, Mr. Ralph Arnold for Fig. 40, Mr. McAdie, forecast official, S.F., for Fig. 7.

H. W. FAIRBANKS.

BERKELEY, CALIFORNIA.

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INTRODUCTION

We study geography that we may better understand the earth and our relation to it.

The earth has a varied surface. The distribution and character of its features have much to do with the climate of different portions. The climate of any particular place determines what plants and animals shall live there. As members of the animal kingdom we are also affected by these things, although to a less degree.

When we know the physiography of a region, that is, what sort of climate it has, whether its surface is made up of fertile valleys or rugged mountains, the nature of its rivers, seacoasts, etc., we can tell pretty certainly what the people of that region are doing.

To make our study of geography of most value we shall try to discover the relation existing between the various facts concerning the earth and the development of the people who live upon its surface. The facts of geography taken by themselves have little value for us. It is only when we discover the connection between these facts that they take on a meaning.

The portion of the earth to which we shall devote our attention in the following chapters is California. We shall take up the physiographic features of the state, learn something about their history and the changes

which they are going through, their effect upon the climate, and how they have influenced the settlement and early history of the region, as well as its later industrial development.

What California is to-day is the result partly of the position and nature of its mountains, valleys, and the character of its coast line, and partly of the energy and intelligence of the people who have settled it.

PHYSIOGRAPHY OF THE CORDILLERAN REGION

THE western half of the United States is largely a region of mountains and plateaus. To this whole area the term Cordilleras is often applied.

The Rocky Mountains lie upon the eastern border of this region. They consist of partly detached and generally rugged mountain ranges, extending from Mexico north across the United States into British Columbia.

Near the western border of the Cordilleran region there is another and parallel system of mountains fully as rugged and elevated as the Rocky Mountains. These mountains extend through the states of California, Oregon, and Washington. In California they are known as the Sierra Nevada range, in Oregon and Washington as the Cascade range.

Between the Rocky Mountain system and the Sierra Nevada-Cascade systems there is an elevated region of great extent. The northern portion is called the Columbia plateau. It is drained by the Columbia River, which, after traversing the plateau in a series of deep cañons, breaks through the Cascade range and enters the ocean. The southern portion of this interior region is drained by the Colorado River and is called the Colorado Plateau. The river pursues a general southwesterly course and

empties into the Gulf of California. It has eroded in the plateau one of the most remarkable cañons of the world.

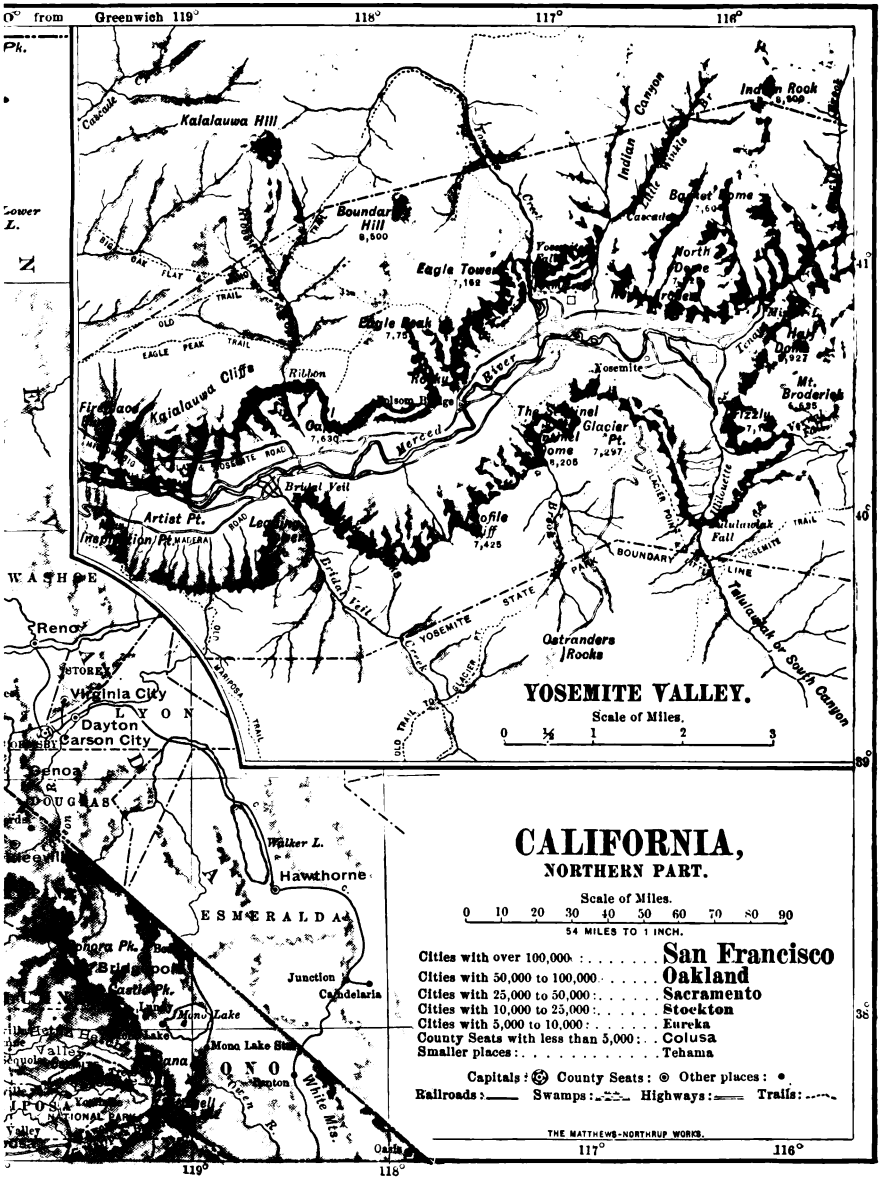
Between the plateaus traversed by these two rivers there is an elevated region which receives so little rainfall that no drainage leading from it has been established. This area embraces nearly the whole of Nevada and large portions of California and Utah. Owing to the absence of an outlet it is called the Great Basin. It is traversed by many north and south mountain ranges, which divide its surface into smaller basins.

West of the Sierra Nevada-Cascade system there is a line of large and well-watered valleys. In California there are the Sacramento and San Joaquin valleys, known altogether as the Great Valley. West of the Cascades in Oregon is the Willamette Valley, and in Washington the valley which is partly drowned by the waters of Puget Sound.

Separating these valleys from the ocean there is another system of mountains known in general terms as the Coast Ranges, but having many local names.

CALIFORNIA

Longitude
DEL NORTE
Crescent City
SISKIYOU
MODOC
Alturas
Warm Springs Valley
Lake Earl
Smith River
Hornbrook
Beswick
Yreka
Montague
Scott River
Ft. Jones
Mt. Hoffman
Medicine L.
Klamath L.
Lower Klamath L.
Tule Lake
Goose Lake
Clear L.
Ft. Bidwell
Upper Lake
Etna Mills
Gazelle
Edgewood
Mt. Shasta
Sawyers Bar
Callahan
Shasta Springs
McCloud
Castle Crag
Craig
Adin
Eagle Pk.
Middle L.
Cedarville
Trinidad
Arcata
Samoa
Blue Lake
Korbel
Eureka
HUMBOLDT
Fortuna
Rohnerville
Ferndale
Burnells
Scotia
Mendocino
Petrolia
Garberville
Burntranch
Weaverville
TRINITY
Hayford
Lewiston
Trinity Mountains
Trinity R.
Klamath R.
Mad R.
Eel R.
South Fk.
Castella
Dunsmuir
Gazelle
Hatchet Creek
Fall River Mills
Bieber
Hayden Hill
Lookout
Burney
Terreo
SHASTA
Round Mountain
Kennett
French Gulch
Keswick
Crater Pk.
Redding
Igo
Anderson
Millville
Cassen Pk.
LASSEN
Shingletown
Eagle Lake
Merrillville
Susanville
Shaffer Pk.
Susan R.
Janesville
Honey L.
Cottonwood Cr.
Cottonwood
Red Bluff
TEHAMA
Tehama
Greenville
Taylorsville
Lake Greenville
Quincy
PLUMAS
Corning
Vina
Loyalton
Paradise
Chico
Cherokee
Oroville
Clairville
Chat
Orland
Germantown
Willow
Glenn
BUTTE
Dogtown
Forbestown
Sierra City
Sierra Valley
SIERRA
Westport
MENDOCINO
Covelo
Fort Bragg
Caspar
Willits
Mendocino
Potter Valley
Ukiah
Elk
Lakeport
Pt. Arena
Point Arena
Hopland
Gualala
Cloverdale
Healdsburg
SONOMA
Cazadero
Windsor
Guerneville
Santa Rosa
Sebastopol
Petaluma
Mt. Konocti
Clear L.
LAKE
COLUSA
Colusa
Williams
Arbuckle
Princeton
Maxwell
Ridley
Honcut
Liveoak
Browns Valley
YUBA
Yuba City
Marysville
Olivehurst
Wheatland
Nevada City
Grass Valley
Smartsville
Dobbins
NEVADA
Forest Hill
Iowa City
PLACER
Colfax
Auburn
Georgetown
ELDORADO
Placerville
Folsom City
Latrobe
Rocklin
Roseville
Lincoln
SUTTER
Rumsey
YOLO
Woodland
Madison
Esparto
Capay
Guinda
Winters
Vacaville
Dixon
Davisville
Saint Helena
NAPA
Calistoga
Sacramento
Florin
Perkins
Plymouth
Volcano
AMADOR
Westpoint
Sutter Creek
Jackson
Mokelumne Hill
CALAVERAS
San Andreas
Ione
Amador City
Elk Grove
SACRAMENTO
Napa
Napa Soda Spr.
Sonoma
SOLANO
Fairfield
Suisun City
Vallejo
Rio Vista
Woodbridge
Galt
Clements
Lockeford
Lodi
Angels Camp
Vallecito
Columbia
Sonora
TUOLUMNE
Jamestown
Chinese Camp
Milton
Peters
SAN JOAQUIN
Stockton
Lathrop
Knights Ferry
Oakdale
Modesto
Waterford
Hughson
Keyes
Ceres
STANISLAUS
Turlock
Denair
Empire
Marvel
Riverbank
Salida
Patterson
Crows Landing
Newman
Gustine
Los Banos
Dos Palos
Volta
Firebaugh
Mercy Springs
Tracy
Livermore
Pleasanton
Dublin
Sunol
Niles
Centerville
Irvington
Mission San Jose
Alameda
Oakland
Berkeley
Emeryville
Piedmont
San Leandro
Hayward
San Lorenzo
Alvarado
Decoto
Newark
Dumbarton
Redwood City
Menlo Park
Palo Alto
Mayfield
San Mateo
Belmont
San Carlos
Millbrae
Burlingame
San Francisco
FARRALONES
Golden Gate
Sausalito
Belvedere
Tiburon
Corte Madera
Larkspur
Kentfield
San Rafael
Ross
San Anselmo
Fairfax
Novato
Petaluma
Point Reyes
Inverness
Olema
Bolinas
Stinson Beach
Muir Woods
Mt. Tamalpais
Mt. Diablo
Clayton
Concord
Martinez
Pacheco
Crockett
Benicia
Vallejo
Mare Island
Port Costa
Antioch
Pittsburg
Bay Point
Clyde
Suisun
Fairfield
Rio Vista
Isleton
Walnut Grove
Courtland
Hood
Sloughhouse
Elk Grove
Galt
Lockeford
Lodi
Woodbridge
Clements
Valley Springs
Campo Seco
Jenny Lind
Copperopolis
Angels Camp
Murphys
Vallecito
Columbia
Sonora
Tuolumne
Jamestown
Chinese Camp
Milton
Peters
Stockton
Lathrop
Knights Ferry
Oakdale
Modesto
Waterford
Hughson
Keyes
Ceres



YOSEMITE VALLEY.

Scale of Miles.

0 ½ 1 2 3

CALIFORNIA,

NORTHERN PART.

Scale of Miles.

0 10 20 30 40 50 60 70 80 90

54 MILES TO 1 INCH.

Cities with over 100,000 : . . . . . **San Francisco**
Cities with 50,000 to 100,000 . . . . . **Oakland**
Cities with 25,000 to 50,000 : . . . . . **Sacramento**
Cities with 10,000 to 25,000 : . . . . . **Stockton**
Cities with 5,000 to 10,000 : . . . . . **Eureka**
County Seats with less than 5,000 : . . **Colusa**
Smaller places : . . . . . **Tehama**

Capitals : ⊛ County Seats : ◉ Other places : •

Railroads : ——— Swamps : ⁻⁻⁻ Highways : ═══ Trails : - - -

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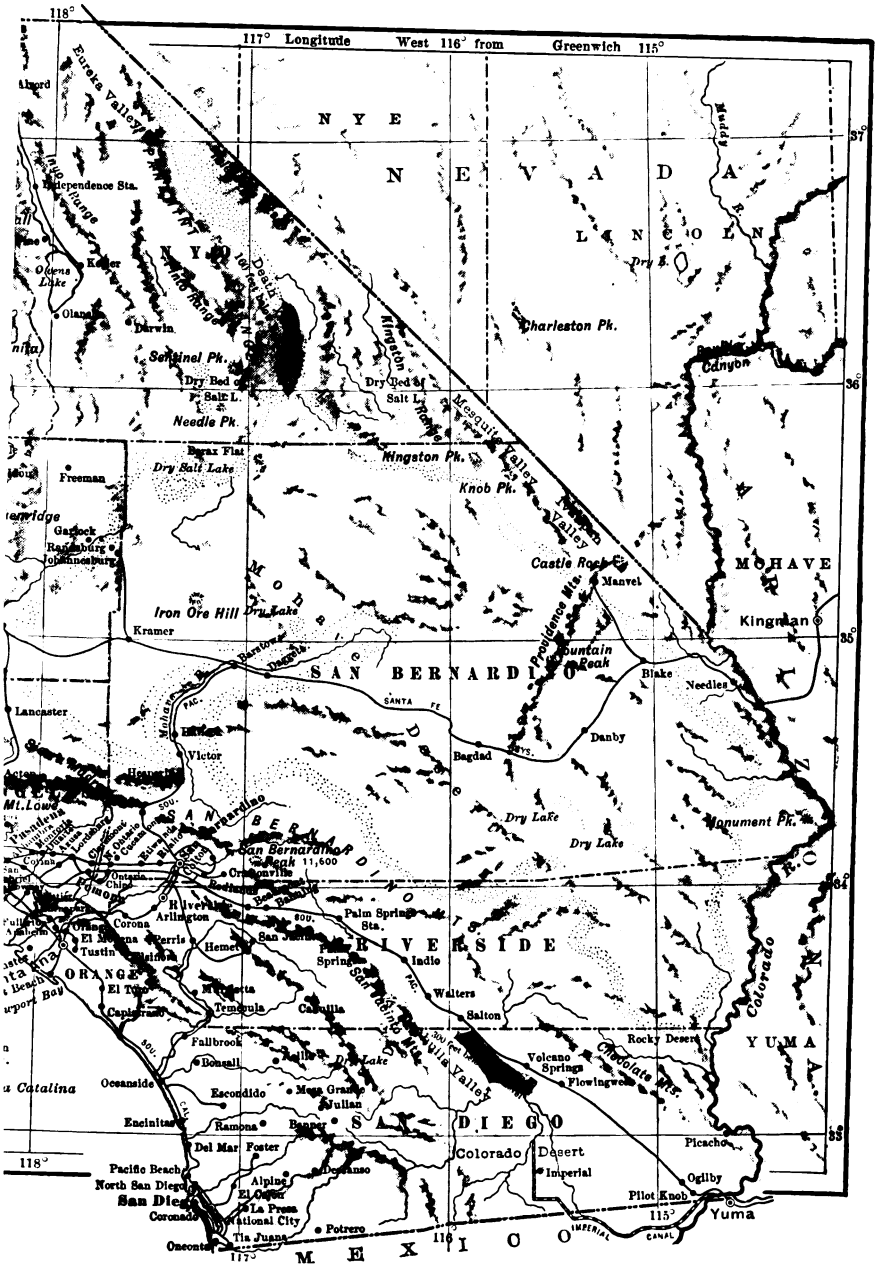
Oakland
San Francisco
Redwood City
Mt. Hamilton
San Jose
Santa Cruz
Monterey Bay
Castroville
Monterey Harbor
Pacific Grove
Monterey
Lake Majella
Salinas
Hollister
Gilroy
Los Gatos
Saratoga
Boulder Cr.
Pt. Sur
King City
Jolon
Lockwood
Soledad
Bradley
Parkfield
C.San Martin
San Miguel
Adelaida
Paso Robles
Templeton
Cambria
Cayucos
San Luis Obispo
Port Harford
San Luis Obispo Bay
Arroyo Grande
Nipomo
Guadaloupe
Santa Maria
Garey
Los Alamos
Surf
Lompoc
Gaviota
Concepcion
Pt. Conception
Naples
Santa Barbara
Carpinteria
Ventura
Montalvo
Oxnard
Chatsworth
Hueneme
Los Angeles
Port Los Angeles
Soldiers Home
Santa Monica
Redondo
Wilmington
San Pedro
Long Beach
SAN MIGUEL I.
Pt. Bennett
SANTA ROSA I.
SANTA CRUZ ISLAND
SANTA BARBARA I.
SAN NICHOLAS I.
SAN CLEMENTE I.
Catalina Harbor
SANTA CATALINA
Gulf of S
Santa Barbara Channel
West Pt.
Laplaya
Santa Cruz Channel
SANTA BARBARA ISLANDS
Mt. Pinos
Neenach
Fairmount
Del Sur
Mt. Whitney
14,898
Mt. Diablo
Mt. Hamilton
Bear Ph.
Humphreys Pk.
Bishop
Big Pine
Independence
Owens R.
Owens Valley
Owens L.
Searles L.
Panamint Mts.
Death Valley
Amargosa R.
Mojave
Tehachapi
Caliente
Keene
Bakersfield
Kern
Famoso
Delano
Glennville
White River
Exeter
Lindsay
Tulare
Woodville
Dinuba
Reedley
Sanger
Fresno
Clovis
Madera
Merced
Livingston
Grubgulch
Ahwahnee
Fresno Flats
Northfork
Raymond
Minturn
Berendo
Tollhouse
Ockenden
Pollasky
Firebaugh
Mendota
Collis
Easton
Fowler
Selma
Kingsburg
Orosi
Traver
Three Rivers
Visalia
Hanford
Lemoore
Huron
Alcalde
Tulare Lake
Kettleman
Laton
Tipton
Portersville
Pixley
Esperanza
Imusdale
Chalome
Shandon
Annette
Creston
Cholame
Rosedale
Asphalto
Buena Vista L.
Kern L.
Arvin
Pozo
Sta.
Los Olivos
Santa Ynez
Nordhoff
Fillmore
Santa Paula
Saticoy
Santa Susana
Simi
Burbank
Mt. Lowe
Pasadena
Azusa
Fernando
Los Gatos
Saratoga
Boulder Cr.
Felton
Glenwood
Gilroy Hot Springs
Alex Banos
Dos Palos
Los Banos
Newman
Crows Landing
Modesto
Turlock
Ceres
Waterford
Hickman
Denair
Keyes
Empire
Riverbank
Oakdale
Knights Ferry
Valley Springs
Milton
Copperopolis
Vallecito
Murphys
Angels Camp
Sonora
Jamestown
Tuolumne
Chinese
Groveland
Big Oak Flat
Coulterville
Hornitos
Mariposa
Bear Valley
Merced Falls
Snelling
Le Grand
Plainsburg
Dos Palos
Los Banos
Gustine


117° Longitude West 116° from Greenwich 115°
NYE
NEVADA
LINCOLN
INYO
MOHAVE
SAN BERNARDINO
RIVERSIDE
ORANGE
SAN DIEGO
YUMA
MEXICO
Eureka Valley
Inyo Range
Independence Sta.
Owens Lake
Keeler
Olancha
Darwin
Panamint Range
Death Valley
Sentinel Pk.
Dry Bed
Salt L.
Needle Pk.
Kingston Range
Kingston Ph.
Charleston Ph.
Canyon
Mesquite Valley
Borax Flat
Dry Salt Lake
Knob Pk.
Pahrump Valley
Freeman
Garlock
Randsburg
Johannesburg
Castle Rock Sp.
Manvel
Providence Mts.
Mountain Peak
Iron Ore Hill
Dry Lake
Kramer
Kingman
Blake
Needles
Lancaster
Victor
Barstow
Daggett
Bagdad
Danby
Dry Lake
Monument Pk.
Mt. Lowe
San Bernardino Peak 11,600
Redlands
Riverside
Arlington
Corona
Palm Springs
Indio
Hemet
Elsinore
Temecula
Walters
Salton
Colorado
Rocky Desert
Volcano Springs
Flowingwells
Chocolate Mts.
Fallbrook
Bonsall
Oceanside
Escondido
Mesa Grande
Julian
Encinitas
Ramona
Banner
Del Mar
Foster
Pacific Beach
North San Diego
San Diego
Coronado
Alpine
El Cajon
La Presa
National City
Tia Juana
Otay
Potrero
Colorado Desert
Imperial
Picacho
Ogilby
Pilot Knob
Yuma
Catalina
Santa Rosa Mts.
Coachella Valley
Salton Sea
Colorado River
IMPERIAL CANAL
SANTA FE
SOU. PAC.
CAN.

PHYSIOGRAPHY OF CALIFORNIA

California is the second largest state in the Union. It reaches from north to south across nearly ten degrees of latitude and has a coast line fully one thousand miles in length. Within California there are regions of extreme moisture and of great aridity, of almost arctic cold and tropic heat. A portion of its surface is below the level of the ocean, while its mountain peaks are among the loftiest in the Cordilleras. Consequently in studying California we shall discover the most marked contrasts in physiography, climate, and productions.

In order to understand, as we ought, the social and industrial development of the state, we must first study its physical features, for these have exerted a marked control upon the direction and wealth of this development.

Relief. — If we examine a relief map of California (Fig. 1), our first impression is that, save for one large valley, it is almost wholly a region of mountains. If, however, we should travel over the state, we would find these mountains separated by countless valleys, some of which are many miles in extent. The large valley so prominent upon the map would be found to be hundreds of miles long, and so broad and level that we would not be far wrong in calling it a plain.

Another fact of importance shown by the relief map is, that the mountain ranges and larger intervening valleys

extend nearly parallel with the coast, that is, in a northwesterly and southeasterly direction.

The plain-like valley reaching fully half the length of the state is the Great Valley of California. It is enclosed by two systems of mountains; the Sierra Nevada upon the east, and the Coast Ranges upon the west. The lowest point in the rim of mountains is across the Coast Ranges, where the drainage of the valley passes out to the ocean.

The northwestern portion of the state appears as a mass of rugged mountains, which are really a continuation of the Coast Ranges, but are known as the Klamath Mountains. The relief map shows that the northeast corner of the state is mountainous, but not so rough. This is the volcanic plateau region.

East of the Sierra Nevada there appears a series of high parallel ranges belonging in the Great Basin. To the southeast of the Sierra Nevada is spread out the vast extent of the Mohave Desert, which is dotted with low mountain ranges.

Upon the coast opposite the southern end of the Great Valley, there is a prominent cape known as Point Conception. This marks a change in direction of both mountains and coast. From Point Conception a continuous mountain range extends easterly far into the deserts of Southern California. East of the junction of the Coast Ranges with the Sierra Nevada, this range becomes much higher and more rugged. It is known under the general term Sierra Madre.

Near the Mexican boundary the coast turns again toward the south. The name Peninsula Range is given to the chain of mountains lying between the Colorado

FIG. 1.

Relief Map of California, by N. F. Drake (Copyrighted).

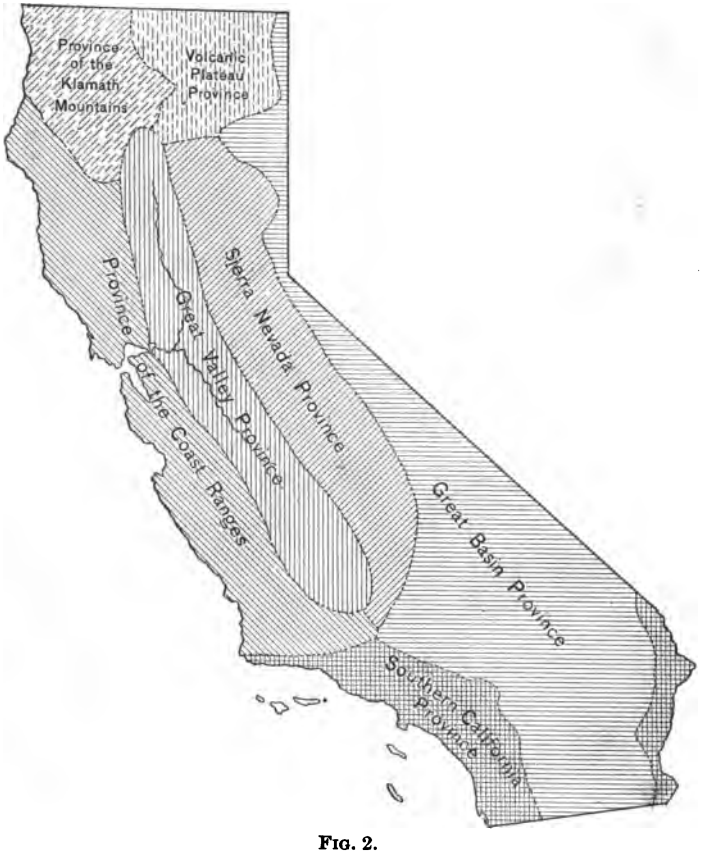

Province of the Klamath Mountains
Volcanic Plateau Province
Sierra Nevada Province
Great Valley Province
Province of the Coast Ranges
Great Basin Province
Southern California Province

FIG. 2.

desert and the ocean and extending south through the Peninsula of Lower California.

Physiographic Provinces. — The topography, climate, and industries vary so greatly in different portions of California that we can best acquire a knowledge of them by studying a portion of the state at a time. Fortunately the physiography is such that we can divide the state into a number of well-defined districts or provinces (Fig. 2).

Sierra Nevada Province. — This elevated tract comprises one great range of mountains 400 miles long and more than 70 miles wide. The mountains rise gradually from the Great Valley upon the west to a jagged crest 10,000 to 14,000 feet high, and then drop down quite precipitously to the desert valleys of the Great Basin. These mountains are noted for their scenery, and their extensive coniferous forests, but more particularly for their valuable deposits of gold, the discovery of which led to the rapid settlement of the state.

The Great Valley Province. — This includes the largest and most important valley west of the Rocky Mountains. It is practically a vast plain 400 miles long and 50 miles wide. The northern arm is known as the Sacramento Valley, the southern arm is called the San Joaquin Valley. The Sacramento River coming from the north and the San Joaquin from the south unite in a region of lowlands and marshes, and, turning west, break through the Coast Ranges and enter the ocean by way of San Francisco Bay.

The Great Valley is the granary of the state. It is also noted for its large production of fruits of all kinds.

The Province of the Coast Ranges. — The Coast Range system includes all those mountains lying between the Great Valley and the ocean. In northwestern California

they blend into the Klamath Mountains, while upon the south they terminate in the San Emedio Mountains, which lie at the extreme southern end of the Great Valley.

Many large and fertile valleys lie among the Coast Ranges. They were formerly noted for their productions of stock and grain, but are now largely given over to fruit raising. Upon San Francisco Bay, most admirably situated for domestic and foreign trade, is the metropolis of the state.

Southern California. — The term Southern California is applied to all that portion of the state lying south of Tehachapi Pass. The deserts of the Great Basin include much of this area, so that for discussion in the supplement only the coastal slope — that lying between the Santa Ynez, the Sierra Madre, and the Peninsula ranges and the ocean — will be regarded as belonging in the Southern California province.

Much of this region receives but a scanty rainfall, and thirty years ago had a semi-arid appearance. The mountains are high, and much more rain falls upon them. The water of the streams, which are supplied from the mountains, has been led out in ditches over these dry valleys and has transformed them into veritable gardens where subtropical fruits are grown in abundance.

Los Angeles, situated in the midst of this region, has become its metropolis and is the second city of the state.

The Province of the Klamath Mountains. — This group of rugged mountains is formed of rocks similar to those of the Sierra Nevada. The highest peaks reach an elevation of over nine thousand feet, and the whole region is cut by deep cañons. Physiographically these mountains form a continuation of the Coast Ranges. Upon the

northeast they are partially connected with the Cascade Range.

The chief products of the Klamath Mountains are gold, copper, and lumber.

The Volcanic Plateau Province. — This province embraces the volcanic region of northeastern California. It has an elevation of three thousand to five thousand feet and is traversed by several ranges of mountains. The province contains the greatest volcanic peaks of the state. Its products are chiefly lumber and stock.

The Great Basin Province. — Fully one-third of the area of California has no drainage to the ocean and is, consequently, included in the Great Basin. The western boundary of the Great Basin is determined by the crest of the Sierra Nevada, the Sierra Madre, and Peninsula ranges. While a portion of this region is plateau-like, having an elevation of four thousand or more feet, another portion is beneath the level of the ocean. Most of the Great Basin is extremely arid, but its mountains and deserts contain minerals of many kinds.

Origin of the Mountains and Valleys of California

The physiographic features of California have more meaning if one knows something of their history.

You have learned from previous work in geography that the rocks exposed upon the surface of the earth are slowly crumbling, and that the streams are carrying the fragments away in the form of sand and clay, finally to drop them in lake or ocean. Mountains whose slopes are steep are undergoing destruction more rapidly, other

things being equal, than those with gentle slopes. There will not always be mountains where we see them to-day, and where we now find rolling hills there once may have been high and rugged mountains.

New mountains have steep slopes and narrow cañons (Fig. 25) through which the streams dash rapidly. After a long time broad valleys will replace the cañons, and gentle slopes the precipitous walls of rock (Fig. 55).

The mountains of California are due to the combined work of many agents. There are examples here of all the different kinds of mountains which one would see if he travelled over the whole world.

The Sierra Nevada Mountains, as well as the ranges to the east and the high mountains of Southern California, are portions of the surface which were elevated as a result of the breaking of the earth's crust. Upon one side of each fracture the land was raised into a range of mountains, upon the other side it was dropped and formed a valley. Such a sudden movement of the earth we call an earthquake. The direction of a mountain range shows the direction of the break, and the steeper face of each range is the one along which the break took place.

The Coast Ranges were formed partly by the method described, and partly by a folding of the crust. The surface of the earth behaves much as does the skin of an apple that is drying. The shrinking of the apple wrinkles its skin, and the contracting of the interior of the earth as it cools causes the crust to form great wrinkles. The mountains and valleys produced by the two methods mentioned are slowly changed by erosion. The water removes the softest rock first. The hard rocks may remain for a long time as mountain peaks and ridges (Fig. 46).

Other mountains, like those in the northeastern part of the state, were formed by volcanic action. The plateaus and the great peaks resulted from the piling up of melted rock, which was forced up from the interior of the earth through openings in the crust (Fig. 58).

The Great Valley, the larger valleys of the Coast Ranges, and those of Southern California were formed by a bending or folding downward of the crust of the earth. The cañons and narrow valleys, throughout all the mountains of the state, were eroded out of solid rock largely through the action of running water.

The great mountain ranges of California are much younger than the mountains in the eastern portion of the United States. To this fact is due the grand and rugged scenery for which the state is noted.

Drainage

The most important watershed of the state is that dividing the drainage of the Pacific Ocean from that of the Great Basin. The dividing line is an irregular one, but most of it is formed by the crests of the Sierra Nevada, the Sierra Madre, and Peninsula ranges (Fig. 1).

The Sierra Nevada Range forms a great barrier upon the east throughout half the length of the state. It is interesting to know that before the geography of the Cordilleran region had been fully explored, it was supposed that there was a large river rising in the Rocky Mountains and flowing westerly into San Francisco Bay. This river was actually located upon the maps of that time, although it would have had to flow across the Sierra Nevada Range.

The volcanic plateau might be thought, from its position, to be a part of the Great Basin, but it is not. The

portion of the Cascade Range extending into California is very low, and two rivers cross it from the interior. The northern one, the Klamath, crosses both the Cascade Range and the Klamath Mountains, passing through the latter in a deep cañon. Pitt River rises in the broad valleys of the plateau region in almost the extreme northeastern corner of the state and flows southwest to join the Sacramento.

Nearly all the valleys of the volcanic plateau formerly contained lakes, but the most of them have dried up or have been drained. Klamath Lake in southern Oregon, and Rhett and Goose lakes in California, are the largest ones remaining.

A study of the drainage of California shows that nearly all the large streams are found upon the coastal sides of the mountains. The reason for this is, that the crest of each of the main mountain systems is near its eastern edge, and the long westerly slopes, facing the direction from which the storms come, receive most of the precipitation.

The streams entering the Great Valley from the Sierra Nevada Mountains have eroded rugged cañons. The most important ones in the southern arm are the Kern, Kaweah, Kings, San Joaquin, Merced, and Tuolumne. Those uniting in the Sacramento are the American, Feather, and Pitt rivers. The united volume of all these streams passes through the strait of Carquinez to San Francisco Bay.

Four streams of considerable size flow easterly from the Sierra Nevada Mountains, and are finally lost in the sinks of the Great Basin. The Truckee River, which is the most northern of these streams, has its source in Lake Tahoe and empties into Pyramid Lake, Nevada. The

Carson River, next south, disappears in the shallow waters of Carson Lake, and the Walker River ends its course in Walker Lake. The fourth of these streams is Owens River, supplying Owens Lake.

During the glacial period, there was a greater rainfall in this region, so that Pyramid, Carson, and Walker lakes in Nevada, and Honey Lake in California, though now separated by miles of desert sands, were then united in one great lake covering more than eight thousand square miles. This ancient body of water is called Lake Lahontan.

Honey Lake, shallow and salt, is situated close under the northern Sierra Nevada. Mono Lake, intensely salt, is situated farther south, close to the eastern base of the mountains. Owens Lake, the largest of the three, is also salt.

The streams of the Coast Ranges generally follow the northwest and southeast valleys, although Russian River and the Santa Maria are exceptions to the rule. Owing to the much heavier rainfall upon the northern coast, the streams there carry much more water through the summer than those farther south, whose channels are often completely dry.

The important rivers of the northern coast mountains, in addition to the Klamath, are Trinity, Eel, and Russian rivers. The Salinas River, emptying into Monterey Bay, has the largest watershed of any stream in the Coast Ranges, but the volume of water flowing in it, except immediately after heavy storms, is insignificant. The San Benito, the Santa Maria, and Santa Ynez are the other important streams of the southern Coast Ranges.

The largest streams of Southern California are the Santa Clara, the Los Angeles-Tujunga, San Gabriel, Santa Ana, San Luis Rey, and San Diego. Owing to the long, dry summers and the sandy floor of the valleys through which they pass, the lower portions of these streams are nearly dry much of the year. However, water can be found by digging down in the sand of the stream beds.

No stream of any consequence enters the Colorado Desert except that known as New River, which, during a portion of the year, is formed by the overflow of the Colorado River.

The Mohave Desert is dotted with many sinks, each of which receives some water from the adjoining mountains during the wet season. The Mohave River is the most important of the streams. It rises upon the northern slope of the San Bernardino Range, and flows fully one hundred miles into the Mohave Desert before disappearing in the sands.

Movements of the Land

Two things have determined the character of the coast line of California. One of these is the direction of the adjoining mountain ranges; the other is the recent movement of the land.

The surface of the earth is never wholly at rest, although it seems to us to be so. That it is constantly rising or sinking is learned from a study of the ocean shore. The floor of the ocean is much more even than the surface of the land, because no erosion goes on there. For this reason a coast that has recently risen will be apt to show a more regular line than one which has sunken, for in the

latter case the water would enter the adjoining valleys and form bays, while the mountains bordering the valleys would form headlands.

The Coast Ranges extend nearly parallel with the shores of the Pacific. One who had never seen California would suppose from this fact that there were no bays extending far into the land. This might be so, but for the fact that the land has recently sunken several hundred feet and has flooded the mouths of the rivers.

FIG. 3.
Looking across the Golden Gate from Fort Point.

Only one large river enters the Pacific from California. At the mouth of this stream, the San Joaquin-Sacramento, there is the only large and well-protected harbor for a distance of more than one thousand miles. As the land sank, the ocean flowed in through the Golden Gate (Fig. 3), which was then, probably, the mouth of the river, flooded the adjoining valleys of the Coast Ranges, and even reached across the mountains into the Great Valley. No great harbor in the world is more finely

situated for foreign and domestic trade than that of San Francisco.

The next most important harbor of California is that of San Diego, in the extreme southern part of the state. This excellent and safe harbor is also the result of the sinking of the land. Somewhat similar to the San Diego harbor is Humboldt Bay, upon the northern coast. San Diego and Eureka will doubtless both increase in importance because of their harbors.

FIG. 4.

Ocean terraces near Port Harford. Lowest one, ten feet; middle one, sixty feet; upper one, one hundred feet above the water.

It can be readily understood that if the mountains extended at right angles to the coast, there would be many more bays, and the interior of the state would have a somewhat different climate. It is interesting to think how much of the state would be flooded if the land should sink five hundred feet more. Many large islands and peninsulas with intervening channels would appear where the Coast Ranges are, and the greater portion of the

fertile fruit and agricultural valleys of the state would be flooded. If such had been the case, California would have been noted chiefly for its mineral products. It is really true that a much greater flooding of the land than this took place not very many thousand years ago, when the ocean rose one thousand to fifteen hundred feet higher than it is at present. This is shown by the old sea cliffs upon the mountain sides facing the ocean. At each level at which the ocean stood, the waves cut back into the land as they are doing to-day. The terraces (Fig. 4), which are so prominent along the coast, have been portions of the old ocean floor at different times. The mesa upon the coast of San Diego County, the broad plain of Los Angeles, the plain of Santa Barbara, and the level lands, of varying width, between the mountains and the ocean nearly the whole length of the state, are due to the action of the ocean waves at some past time.

The Islands and Submarine Plateau

The floor of the ocean does not slope down directly from the shore to the great depths of the Pacific. Nearly the whole length of California there is a submarine plateau over which the water is comparatively shallow. Off northern California the plateau is only ten miles wide, but toward the southern part of the state it extends out two hundred miles. Outside of this plateau the ocean deepens rapidly.

This plateau belongs to the continent of North America and not to the bed of the Pacific. In past times much of it was dry land, and it may sometime be elevated again.

The islands along the coast rise from the surface of the plateau. They are exposed portions of submerged mountains. The most northern group of islands lies twenty miles off shore nearly opposite the Golden Gate. These islands are small and rocky.

FIG. 5.

Avalon — Santa Catalina Island. The harbor was formed by the sinking of the land.

The islands situated off the coast of Santa Barbara are known as the Channel Islands. The most important ones are San Miguel, Santa Rosa, and Santa Cruz. They belong to a submerged mountain range once connected with the mainland.

San Clemente and Santa Catalina lie to the south, and rise from deeper portions of the plateau. Santa Catalina has become noted as a resort for tourists and pleasure seekers (Fig. 5).

Climate

California extends so far from north to south that we would expect it to show a great variation in climate. When compared with the Atlantic coast, its northern boundary is seen to be nearly in the latitude of Boston, while its southern boundary is about that of Savannah, Georgia.

However, the variations in the climate of California are due not so much to its great extent in latitude as to other and secondary causes. Chief of these is its nearness to the Pacific Ocean, from whose vast expanse come the evenly tempered westerly winds. Other modifying causes of importance are the direction of the mountain ranges and elevation above sea level.

It would be hard to find another country of equal size with such contrasts in climate as California. Subtropical fruits grow here in proximity to those of the colder, temperate latitudes. While the annual rainfall in the northwestern part of the state may reach eighty inches, in the desert regions of the southeast it rarely exceeds three inches. (Fig. 6.)

The temperature of the Pacific Ocean varies but little throughout the year, and as the prevailing winds are from the ocean, the portion of the state immediately adjacent has a remarkably even climate. Frosts are not frequent in winter, and in summer the winds are always cool. During the summer season warm currents of air descending upon the cool surface of the ocean produce heavy banks of fog, which sweep inland (Fig. 7) through the valleys sometimes for a distance of thirty miles.

As one leaves the coast and goes inland, the effect of the

ocean winds is felt less, and the extremes in temperature become much greater. The mountains lie across the path of the ocean winds, so that the cooling effect of the latter is lost much quicker than it otherwise would be.

In the Great Valley the summers are dry and hot, but even there, nearly one hundred miles from the ocean, the winters are so tempered that oranges can be grown as far north as Red Bluff. The Great Valley has no summer fog, but during the winter it is sometimes covered with fog many days at a time.

FIG. 7.

Ocean fog pouring over the hills into San Francisco bay.

Altitude has a marked effect upon the summer climate of the coast region; this effect is opposite to that experienced in most places. For instance, on Mt. Tamalpais, near San Francisco, at an elevation of twenty-five hundred feet, a warm summer climate exists, while the valleys below are buried in the cool fog.

As the higher mountains are ascended, a climate similar to that of the cooler temperate regions is experienced. The summers are very pleasant; the winters, cold and

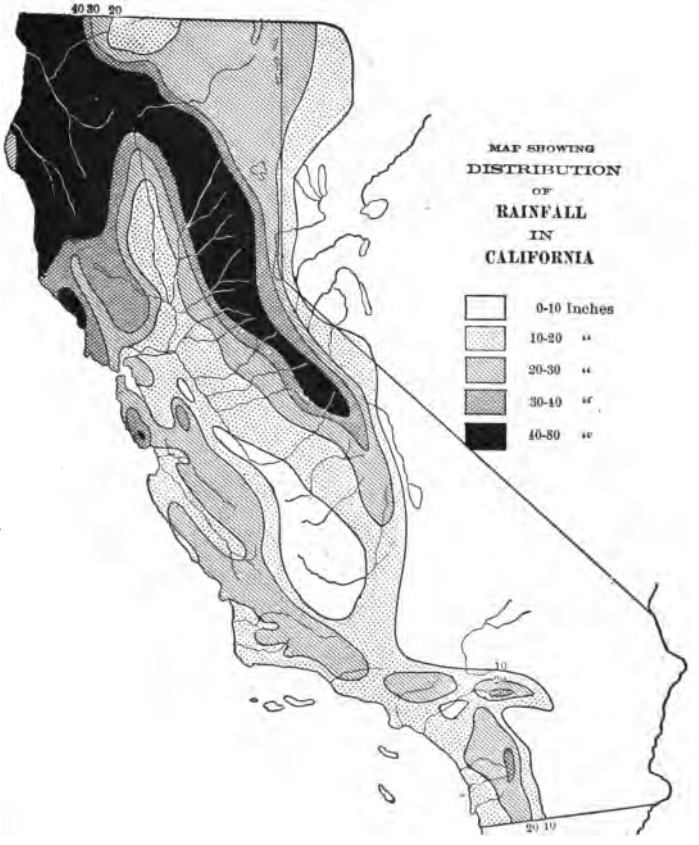


FIG. 6.

Explanation. — It will be seen from the above map that the annual precipitation is influenced by three things: latitude, elevation, and distance from the coast. Map compiled by Prof. E. W. Hilgard.

snowy. Near the summit of the Sierra Nevada Mountains arctic conditions prevail.

In the southern portion of the Great Basin region, especially in Death Valley, the Mohave and Colorado deserts (Fig. 59), the summer heat is intense. These deserts are so enclosed by mountains that the ocean winds do not reach them, and during the long summer days the air becomes heated as in an oven.

Winter is the wet season, summer the dry season. In the higher mountains the precipitation is mostly in the form of snow, which often falls to a depth of fifteen to twenty feet. In the valleys it is generally rain.

The wet season increases in length as we go from south to north, until in western Washington rain falls every month in the year. Most of the storms originate as cyclonic disturbances in the north Pacific. They pass southerly and easterly, encountering the land. As winter approaches, these storms, often hundreds of miles in diameter, extend farther and farther south, until the coast region as far as Mexico receives rain. Many of these storms do not extend farther south than Oregon or Washington. They pass easterly over the Rocky Mountains, and across the northern states. Consequently the frequence and intensity of these storms decrease as we go south along the coast.

The storms are areas of low pressure, and they move in the direction of least resistance. If there is a stationary area of high pressure over central California, a storm coming in from the Pacific will probably move east through Oregon and Washington. If the area of high pressure remains long enough, California will have a dry winter. If the pressure is low over California, more of the storms will move south, and a wet winter will be experienced. During the

summer none of the cyclonic disturbances reach California, and only a few of them come in upon western Washington. Hence little or no rain in summer.

Since the storms come from the ocean, it is fortunate for the productiveness of California that the higher mountains lie near its eastern border, and the lower ones near the coast. The western slope of the Coast Ranges receives more rain than their eastern slope. The western side of the Great Valley, because of the presence of the Coast Ranges, is deficient in rainfall, and the southern end is practically arid. The western slope of the Sierra Nevada Mountains has a heavy precipitation, which increases as we ascend. The crest of these mountains marks a fairly abrupt change. To the east the rainfall is very light, and the Great Basin is relieved from utter barrenness by the small precipitation upon the summits of mountain ranges which traverse it.

Thunderstorms are not common in California, except in the mountains in the summer. In the desert portions the sudden heavy rainfall which sometimes breaks upon the barren mountains is called a cloudburst. The destructiveness of these storms is due to the fact that there is little soil or vegetation to retain the water, so that it quickly gathers in the gulches and sweeps down them with great force, bearing enormous quantities of sand, gravel, and boulders out into the desert valleys. In this way are built up the long even waste slopes characteristic of the desert region.

During the winter southerly winds with a falling barometer indicate the approach of a storm, while northerly winds follow the passage of a storm toward the east.

Vegetation and Animal Life

The vegetation of a region is more directly dependent upon climatic conditions than is the animal life, for plants cannot move from one place to another. The chief factors affecting it are the amount and distribution of the rainfall, the temperature, and the character of the soil.

Except for the growths along the streams much of the Great Valley, the desert regions, and the valleys of Southern California are treeless. Following the winter rains the foothills and valleys become covered with a variety of grasses and a profusion of brightly tinted flowers. Even the vast sandy tracts of the Mohave Desert for a short time during favorable years are a veritable garden of flowers.

The most of the desert regions contain such shrubs as the mesquite and greasewood. In the Colorado Desert there are several species of cactus. This plant is also found in the more moist portions of Southern California.

Fig. 8.
Spanish bayonet in bloom. A characteristic plant of semi-arid slopes.

The Mohave Desert is remarkable for the groves of yucca (Fig. 9), which in places cover its slopes as far as the eye can reach. In a cañon upon the eastern slope of the San Jacinto Mountains occurs the native California date-palm (Fig. 10). Seeds of this palm were planted in the mission gardens, and

now it is common as an ornamental tree. The valleys and plains of the Great Basin and plateau region, where more rain falls, are covered with sage-brush and some grasses.

The steep mountain slopes of central and southern California, below the coniferous belt, are generally overgrown with shrubs or chaparral. These consist chiefly of the chamiso, California lilac, manzanita, sage, and scrub-oak.

Portions of the Sacramento Valley, the foot-hills of the Sierra Nevada, and the valleys and hills of the Coast

FIG. 9.
Yucca forest in the Mohave Desert.

Ranges are covered with groves of different species of oak. The white oak is the most characteristic species. The live-oak (Fig. 39) is also widely distributed. Other common trees are the sycamore, cottonwood, laurel, and madrone.

The forests of California contain the largest and greatest variety of coniferous trees found anywhere upon the earth. For these trees to flourish a fairly abundant rainfall is necessary, but over most of the state the precipitation in the valleys is insufficient. In the southern portion

the coniferous forests do not reach below five thousand feet, but as we go toward the north the rainfall increases, and the forests extend lower and lower, until in the northwest coast counties they occupy the lowlands along the ocean.

FIG. 10.
The home of the Washington Palm, San Jacinto Mountains.

The yellow pine, sugar pine, fir, spruce, cedar, and sequoia are the most important of the coniferous trees. The most important forest belt extends along the western slope of the Sierra Nevada-Cascade Range, and is often thirty miles in width. The forest belt may be divided into four parts. Upon the lower mountains and foot-hills are oaks. Above them is the yellow-pine belt, and then, most important of all, the belt of sugar pine, fir, spruce, cedar, and sequoia reaching up to nine thousand feet. Above that are the alpine pines and junipers to eleven thousand feet.

In the Coast Ranges no large bodies of coniferous trees are found south of Santa Cruz County. The redwood (*sequoia sempervirens*) is found from the Santa Lucia Range north to the Oregon line. This tree reaches its greatest development in Mendocino and Humboldt counties, where

it forms magnificent forests (Fig. 43). These forests furnish a large proportion of the lumber produced in the state.

The sequoias are the most wonderful conifers in the world and are confined to California. There are two species — the redwood and the Big Trees. The latter (*sequoia gigantea*) (Fig. 22) occurs in groves scattered along the western slope of the Sierra Nevada, at an elevation of six to eight thousand feet.

At Monterey there is a grove of a species of cypress which occurs only in California. It is quite commonly used as an ornamental tree and for hedges.

The forests have suffered greatly from fires and the careless work of the lumbermen and stockmen. In order to preserve the trees from further reckless waste, and to lessen the danger of a decreased summer water supply by the removal of the vegetation at the sources of the streams, certain large tracts in the mountains have been set aside by the government as forest reserves. These reserves now cover nearly eleven thousand square miles. They are located in different portions of the Sierra Nevada Mountains, Coast Ranges, Sierra Madre, and Peninsula ranges.

In addition to these forest reserves there are, in the Sierra Nevada Mountains, three national parks: the Yosemite, General Grant, and Sequoia. In these parks not only the vegetation, but the wild animals, are protected. Here they will have a chance to live unmolested and recover from the inroads which have been made upon them.

In the Coast Ranges it is proposed to reserve an area of redwood forest in Big Basin, Santa Cruz County, where these great trees may remain unharmed.

Climate has an important influence upon the distribution of animals. In ascending the high mountains we find that their cold summits are not inhabited by the same animals which live in the valleys. The animals of the desert regions are not like those of the cool and moist coastal regions. Each species is adapted to the place in which it lives.

Many animals not existing in California at the time of its settlement inhabited its mountains and valleys at a not very remote time. Their bones have been found buried in the soil and gravels. There were the elephant, mastodon, camel, llama, tapir, horse, hog, buffalo, lion, and a rhinoceros-like animal.

Many other animals were abundant when the Spaniards came. Most important among these were the grizzly and black bear, the cougar or mountain lion, wild cat, coyote, elk, deer, antelope, and other smaller animals.

Bear are now found only in the wildest parts of the state. The cougar is still seen in rocky and brushy places. The wildcat is more common, while the coyote is found almost everywhere through the lower mountains and open rolling country. The coyote is one of the worst enemies of the stockmen, but nevertheless it does much good in destroying other animal pests, such as the jack-rabbit and ground squirrel.

Deer are still found in the mountains, but the antelope and elk, which were formerly abundant, have disappeared. The most characteristic squirrel of the mountains is the gray squirrel, which inhabits the coniferous forests. At higher altitudes are found the badger, the marmot, and the mischievous little chipmunk.

The birds native of the state that are the most hunted

for food are the quail of the foothills and valleys, and the grouse of the timbered mountains and plateau regions.

There are many species of birds found in California that are not known in the Eastern states. The California vulture is quite rare. It is, next to the condor, the largest of the birds of prey. The road-runner, related to the cuckoo, is found in the southern portion of the state and is remarkable for the speed with which it runs over the ground.

Eagles, owls, woodpeckers, humming-birds, and many species of song birds inhabit the state. Numerous species of water-birds pass across the state in their migrations, and some of them winter here. The most important are the ducks and geese.

Many species of fish are caught in the streams and along the coast. The most important of these is the salmon, which spends a part of its life in the ocean but ascends the streams to spawn. One of the most interesting water animals which frequent the coast of California is the sea-lion, a species of seal. It can often be seen upon the rocky islands close to the shore.

To preserve the animal and bird life, laws have been enacted limiting the time in which they may be killed. The wanton destruction of game is wrong, for if persisted in we shall lose many animals and birds which are of great value and whose presence affords us much pleasure.

Natural Resources

The resources of a country which possesses little diversity in its climate and physical features cannot be as varied as those of one which has a surface of mountains and valleys exhibiting marked contrasts in climate.

Those portions of the earth's surface where large valleys or plains predominate are noted for their agricultural products, while those occupied by mountains furnish minerals of various kinds.

California is a region both of mountains rich in minerals and of fertile, well-watered valleys. Almost every kind of climate in the United States, from the extreme south to the extreme north, can be found in California. As a result of all these facts it has the greatest variety of products of any state in the Union.

In the valleys of the central and southern parts subtropical fruits, such as oranges, lemons, figs, olives, and raisin grapes, flourish. In valleys somewhat cooler can be grown the apricot, peach, prune, cherry, pear, and grape, while the mountains produce excellent apples. The large valleys of the state have been devoted mostly to grain, while upon those portions too rough for agriculture, large numbers of cattle and sheep are pastured.

The coniferous forests, if properly cared for, can furnish an almost limitless amount of lumber.

The mountain regions supply minerals, especially gold, the discovery of which first attracted the attention of the world to California. Gold-bearing quartz veins are found in nearly all the mountainous portions of the state, the main exceptions being the volcanic plateau region and portions of the Coast Ranges. Copper, silver, quicksilver, lead, and other minerals are mined in many places.

In recent years important deposits of petroleum have been discovered. This will aid in the development of manufacturing, for coal, which is found so abundantly in many of the Eastern states, occurs only in limited quantities in California.

Even the deserts have been found to be valuable, for in the basins of the ancient lakes are extensive deposits of borax, soda, and salt.

Both hot and cold mineral springs are abundant, especially in the Coast Ranges north of San Francisco, and are valuable because of their medicinal qualities.

For its mineral products, sub-tropical fruits, and agreeable climate, California has become noted over the whole world.

History and Industrial Development

Discovery. — We cannot get a good understanding of the history of California unless we know how it has been influenced by physiography. Ever since men have spread from old settled regions into new, or have carried on explorations, the paths along which they have travelled have been largely determined by the features of the land and water.

Knowing something of the geography of North America, of the chains of rugged mountains and almost impassable deserts which shut off the Pacific coast from the Mississippi Valley, we would naturally expect that California would be discovered and first settled by the pathway of the ocean.

It was a Spaniard who first sailed along its shores, for Spain was, in the sixteenth century, one of the most enterprising nations of Europe. Shortly after the conquest of Mexico, Cortez extended his explorations along the shores of the Pacific. In 1535 what is now known as Lower California was discovered. The name California was probably first applied to this land. The name is supposed to have been derived from a Spanish romance, in which it

was used for a fabulous island in the Pacific. Later the designation California was extended to all the Spanish possessions between Mexico and what we now know as Oregon.

After the discovery of Lower California, stories came to Cortez of great and rich cities far to the northwest. An expedition by sea proceeded some distance up the Colorado River, but owing to the desert character of the country the explorers dared not leave the river. In 1542–1543 the coast of Upper California was visited by Cabrillo, who sailed as far north as Cape Mendocino and landed at several points.

In 1579 the famous navigator Drake, in search of a northern route to the Atlantic Ocean, visited the coast of California and spent several weeks in a little bay which is supposed to be the one now known as Drake's Bay, a few miles north of the Golden Gate. Although so near the great bay, Drake evidently knew nothing of it. In 1602–1603 Sebastian Vizcaino sailed along the coast and discovered San Diego and Monterey bays. He also sailed past San Francisco Bay without seeing it and anchored in Drake's Bay.

Spanish Settlement. — Then for more than 150 years nothing more was heard of California. It seems to have been almost forgotten. At last the Spaniards of Mexico, aroused to the importance of the northern coast, sent out several expeditions. San Diego Bay was entered in 1769, and the mission was founded shortly after. From San Diego an expedition started northward overland to rediscover Monterey Bay, but owing to the peculiar physiography of the region they passed it unawares, and reached and discovered the bay which shortly afterward was named San Francisco.

The purpose of Spain in her explorations was twofold: (1) to found missions for the purpose of converting and civilizing the Indians, and (2) gradually to establish colonies in the fertile valleys. After the founding of the San Diego mission, others were located at favorable points along the coast and in the valleys adjacent as far north as Sonoma. Between 1769 and 1823 twenty-one missions were founded, that at Sonoma being the last.

FIG. 11.

San Carlos Mission, Carmelo Valley.

As we go over the state to-day and view the crumbling ruins of the picturesque churches which they erected, we cannot help admiring the sagacity of those pioneer mission fathers. Nearly all the missions have beautiful surroundings. They were located where the soil was rich and the streams could be led out in ditches to irrigate their orchards and vineyards. Later, towns grew up about many of these missions and are thriving places to-day.

Many Indians were gathered about the missions, and the latter soon grew rich and prosperous. The mission fathers gave comparatively little attention to agriculture, but the thousands of cattle and horses which roamed the hills constituted their chief wealth.

In 1792 Vancouver visited the coast, and four years later the first American ship touched at Monterey. In 1812 the Russians established a base of supplies upon the coast north of San Francisco Bay. This post they held for nearly a third of a century. The place is known as Fort Ross, and the Russian church and old blockhouses are still standing.

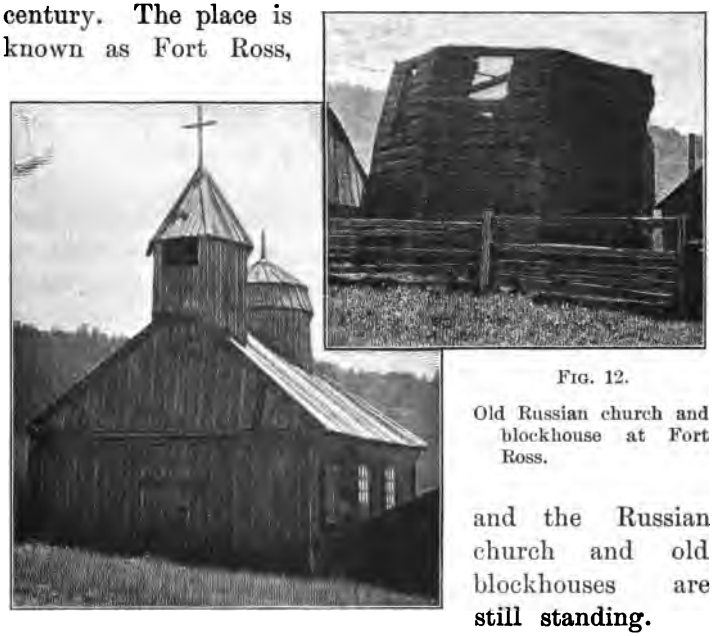


FIG. 12.

Old Russian church and blockhouse at Fort Ross.

Indians. — The physiographic features exerted a strong influence upon the distribution of the Indians. They were largely restrained by natural barriers, such as mountain ranges and deserts, so that in almost every valley a different language developed. Thus many tribes of Indians arose in California differing in language but having many characteristics in common. They appear to be intellectually inferior to the Indians who were

found occupying the eastern portion of the United States.

Near the coast the Indians lived largely upon fish and mollusks. Scattered along the shore are many shell heaps where they gathered for their feasts. They used implements of stone and made beautiful baskets which were woven so tightly that they would hold water. Away from the coast the Indians lived largely upon acorns, nuts, and roots, and have for this reason been called Diggers. They were not able to stand contact with civilization and now are nearly gone.

FIG. 13.
A Klamath River Indian.

American Exploration and Conquest. — During the most of the Spanish occupation life went on quietly in California. The climate was agreeable, and little work was done, the people depending for their support chiefly upon the increase of their herds. They were free and hospitable. The population increased slowly and at the time of the conquest was less than twelve thousand. In 1837 the missions were secularized and soon began to fall into decay.

Owing to the fact that California is shut off by deserts and mountains from the settlements in Mexico and the eastern United States, its trade was for a long time

entirely by water. In the early part of the last century American trading-ships touched at various points, bringing goods, and taking hides and tallow in exchange. Cattle formed the wealth of the early Spaniard. He raised no more grain or fruit than was used at home.

The first party to cross the Cordilleran barrier was the exploring expedition under Captains Lewis and Clark. This was in 1805. They did not go farther south than the Columbia River. Then the daring and hardy trappers with their headquarters at St. Louis penetrated the Rocky Mountains, and in 1828 one party crossed the Sierra Nevada Mountains into California. The present eastern boundary of California was not determined until after it became a part of the Union. Mexico claimed the whole of the Cordilleran region as far north as the forty-second degree of latitude.

The first emigrants from the East came in 1841, and settled in the vicinity of Sutter's Fort, an establishment on the Sacramento River near the mouth of the American River. In 1844 Fremont reached California upon the first of his exploring expeditions. He crossed the Sierra Nevada Mountains in the heart of winter and endured great hardship. Fremont, because of his important geographical explorations, has been called the Pathfinder. His work added much to our knowledge of the Cordilleran region.

In 1846 Commodore Sloat hauled down the Mexican flag at Monterey, the old capital of the province, and after several skirmishes in the southern part of the state, in which General Kearney, Commodore Stockton, and Lieutenant Fremont took part, Mexican rule ceased. California was formally ceded in 1848.

In 1846 many parties of emigrants started across the continent. They suffered greatly; nearly all the members of the Donner party perished in the snow, near the lake now called Donner (Fig. 14).

Prior to the conquest of California, a little settlement called Yerba Buena had grown up close to the water upon the present site of San Francisco, and in 1847 its

FIG. 14.
Donner Lake from Donner Pass.

name was changed to that of the present city. The peninsula was then desolate and forbidding, covered with brush and drifting sand.

Discovery of Gold. — In 1848 came the discovery which was to revolutionize the history of the great territory of California. A man by the name of Marshall, while erecting a mill for Sutter, near the site of the present town of Coloma, El Dorado County, discovered particles of gold in the sand of the mill race. The news reached the East

in a few months, and then, in 1849, began the great migrations which continued for a number of years. There were two ways by which people could reach California: the water route around Cape Horn or by way of the Isthmus of Panama, and the land route by means of wagon trains.

We can now hardly imagine the dangers and difficulties that lay in the way of the early emigrants who crossed the plains. Usually in the settlement of a new country the easiest natural routes are followed. These are the waterways. In the rush to reach California, however, men tried to overcome the great obstacles which Nature

FIG. 15.
Travelling to California in the Pioneer Days.

had placed in the way. Much of the region to be traversed was occupied by the most desolate of deserts, waterways were few, and mountain ranges stretched unbroken across their path.

In 1849 more than twenty thousand gold-seekers started west from the Missouri River. The caravans crept slowly along, drawn mostly by oxen (Fig. 15). There was constant danger from the Indians, and of perishing from thirst in the deserts. The desert sinks of the Humboldt and Carson rivers in Nevada, and the steep rugged crest and cañons of the Sierra Nevada Mountains were the worst obstacles. Central California could not be reached without crossing

the great mountain wall of the Sierra. One of the routes was by the way of Truckee River and Donner Pass (Fig. 14). Others led up the Carson River and across the crest to the streams flowing westward. As we trace the paths of the emigrants we can hardly believe that they took wagons through these rugged cañons. Some of the emigrants entered California by skirting the southern Sierra Nevada, but often suffered greatly in the deserts. The experiences of one party gave rise to the name of the great sink called Death Valley. Other emigrants came into northeastern California over what has been called the Lassen trail. Peter Lassen was the pioneer on this route, and Lassen Peak was named after him.

The population of California increased at a rapid rate, and at the close of 1849 there were nearly one hundred thousand inhabitants. It is estimated that forty millions in gold were taken out in that year. In 1850 California was admitted as a state of the Union.

Mining. — For a long time every one who could went to the mines. Visions of gold were in all minds. Provisions of every kind became very high. At first very simple methods were used in mining: a pick and shovel, and pan in which to wash the gold were the only tools. Then the rocker was invented (Fig. 16). After a time, as the shallow stream gravels were worked over, men began to explore the deep gravels of the ancient streams, and hunt for the source of the gold in the numerous quartz veins which dotted the mountain sides. This led to the discovery of the Mother Lode, one of the most important series of gold-bearing quartz veins known in the world.

The mining of the old river channels required much water, and companies were formed to work them. These

gravels proved to be very rich, but so much débris was washed into the streams that the bottom lands along many of them were flooded and ruined. As a result of this, hydraulic mining is now carried on in the drainage

FIG. 16.
Chinaman washing out gold with a rocker.

basin of the Sacramento much less extensively. Quartz mining has gone on increasing, and throughout many of the mountainous regions of the state there can now be heard the stamp of the mills pounding out the gold. Some of the mines are more than two thousand feet deep.

Stock Raising and Agriculture. — Agricultural pursuits were neglected for a long time after the discovery of gold. It was supposed that much of the central and southern portion of the state was too dry to grow crops, and consequently stock-raising continued to be the leading industry. Sheep were added to the stock of the native Californians and soon were grazing in countless numbers upon the public lands. After a time it was realized that the sheep

were killing out the grasses and other vegetation which retain the soil and moisture upon the mountain slopes. By the establishment of the forest reserves and the increase of settlers the ranges for stock have been limited, and now this industry has greatly declined.

It gradually became known that grain could be grown, in years of average rainfall, in many of the valleys where it had been thought that the land was useful only for pasturage; and so California took its place as one of the important grain-producing states.

Wool and hides and grain could be shipped to market by water, so that there was no limit to the amount of these things which might be profitably produced, but large fruit orchards would not pay without quicker means of transportation.

Means of Communication. — The overland stage made the distance from the Missouri River in twenty-one days, but as population and business increased, better mail facilities became a necessity, and the pony express was started. The route followed the main emigrant trail from Sacramento, across the Sierra Nevada Mountains and the deserts, to Salt Lake City, and thence to St. Louis. Under incredible dangers and hardships the mail was carried this distance in eleven days.

The state continued to grow so rapidly that these primitive means of communication with the East would not suffice. Railways must be built. The first one was constructed in 1854, between Sacramento and Folsom. In the decade beginning with 1850, the government organized the Pacific Railroad survey for the purpose of determining the most practicable route for a railroad. The difficulties in the way were great, but at last the Central

Pacific company was organized, and in 1867, in connection with the Union Pacific, a transcontinental line was opened. Later other railroads entered the southern part of the state by way of Arizona and New Mexico.

Development of Fruit Industries. — The mission gardens, where oranges, lemons, figs, grapes, olives, and other fruits had long been grown, showed what the land would produce when properly cared for. The era of great ranches, where only cattle and grain are produced, is slowly passing away, and, with the understanding of what may be done by irrigation, there has come the era of small ranches and fruit growing. The supposedly desert valleys of Southern California have been found to be very productive when irrigated, and the climate is particularly adapted to subtropical fruits. Its orange groves have made Southern California celebrated the world over. Oranges have also been found to do well nearly the whole length of the Great Valley. In the valleys which are rather too cool for oranges, there are now thousands of acres given over to growing prunes, apricots, peaches, pears, and apples.

In addition to its subtropical fruits Southern California has become noted for its mild and healthful climate, and thousands have been drawn there for this reason. The ancient pueblo of Los Angeles, whose location was so wisely chosen, has become a large city in the centre of the garden spot of Southern California.

The exceptionally favorable conditions for the development of a great commercial centre upon San Francisco Bay have resulted in the present city, which has a population of more than a third of a million. Through the opening of trade with the nations of the Pacific, it is destined to become one of the largest cities of the world.

Manufacturing has been of slow growth upon the Pacific coast, because of the high price of fuel and labor. The discovery of extensive deposits of petroleum must make up in great part for the lack of coal, and rapidly lead to the development of manufacturing.

The conditions under which California was settled drew here an exceptional population, and it was not long before an excellent school system was established. With schools scattered everywhere through the state, and two great universities, the culture of California should keep pace with its material prosperity.

The Sierra Nevada Province

Extent and History. — The Sierra Nevada is the most important mountain range of California. It excels every other in the Union in the extent, regularity, and ruggedness of its features.

From Tehachapi, at the southern end of the Great Valley, the Sierra Nevada Mountains extend 400 miles in a northerly direction nearly to Lassen Peak, with an average width of 70 miles. The highest portion of the range lies very near its eastern edge, and for 200 miles this crest is seldom lower than 11,000 feet. Scores of peaks reach an elevation of about 14,000 feet, and Mount Whitney rises to 14,522 feet. This is the highest peak in the United States outside of Alaska, with the possible exception of Mount Rainier (original Indian name Tacoma).

The important physiographic features of the Sierra Nevada can be easily understood if we picture this range as a great block of the earth's crust, which has been pushed up along its eastern edge. This is why the

eastern slope is short and very steep, and the western one nearly seventy miles long and quite gentle.

The region now occupied by these mountains formed a part of the bed of an ancient ocean long after land appeared in the northeastern part of the United States, and even after there were mountains in the region of the Coast Ranges. There were many long periods of volcanic action in the Sierra region, but at last it was lifted to form permanent dry land. Then, after a time, through the many fissures in the rocks streams of mineral waters began to flow. These waters came from far down in the earth where it was very warm and brought, in solution, the silica which was to form the thousands of quartz veins. These waters also carried little particles of gold and other minerals, which were deposited with the quartz.

Long ago streams flowed down the western slope of the Sierra Nevada Mountains, as they do now, carrying away the fragments of waste as the rocks slowly crumbled. The quartz veins, as they were exposed upon the surface, also crumbled, and the particles of gold contained in them, being so much heavier than the fragments of rock, were not carried far, but were gathered at the bottom of the gravel along the bed-rock.

Finally, after thousands of feet of rock had been carried away, these ancient mountains were so nearly worn down that the streams flowed slowly in broad channels, filled often hundreds of feet deep with gravel. Then volcanic action commenced again along the summit of these old mountains, and streams of lava flowed down the river beds and deeply buried the gold-bearing gravels (Fig. 18). After this the mountains were elevated again along their eastern edge and tilted toward the west. This made the

streams run swiftly, and they began to work, excavating new channels. In this manner were formed the great cañons, two to three thousand feet deep, which traverse the slopes of the mountains at the present time. These cañons were eroded in many places across the channels of the old streams, and their gold-bearing gravels were left exposed.

Now the scenery of the Sierra Nevada Mountains is very grand. The streams which rise in beautiful lakes, whose basins were formed by the glaciers, dash and tumble through the cañons, and finally issue quietly upon the slopes of the Great Valley, where they are gladly utilized in irrigation.

Gold Mining. — The discovery of gold first led to the settlement of the Sierra Nevada Mountains. From the lower foot-hills up to an elevation of five thousand feet there are many little towns which depend chiefly upon mining. While gold is the most important mineral, there are also found copper, silver, and iron. Quarries of granite have been opened, and at some points beautiful marble is found.

The first mining was in the gold-bearing gravels of the present streams. This is called *placer* mining. The pan was the first implement used to separate the gold. Then the rocker was invented, and after that the sluice. The latter is a long, narrow box, made of boards, through which a stream of water is allowed to run. The gravel is shovelled into the sluice, and the gold, being heavy, settles to the bottom and is caught by little crosspieces. The largest nugget was found at Carson Hill. It weighed 195 pounds and was worth $43,534.

The mining of the deep gravels of the ancient rivers

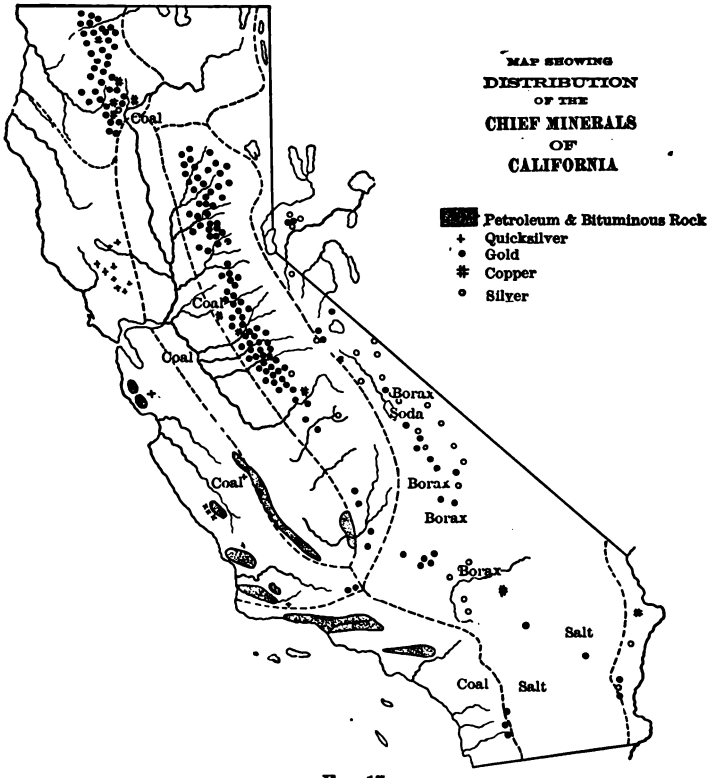


FIG. 17.

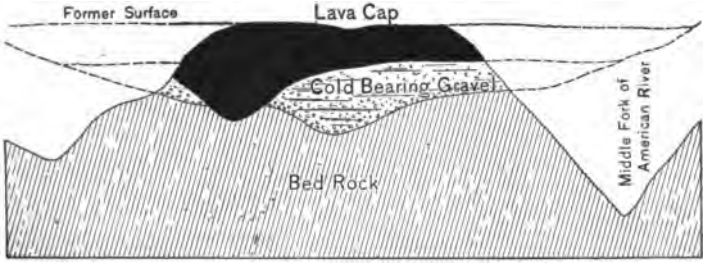


FIG. 18.

Sketch showing the relation of the present cañons of the Sierra Nevada Mountains to the lava-capped beds of the ancient streams.

is called hydraulic mining, and the methods employed are different from those of placer mining. The gravels were sometimes reached by tunnels, but more often water was brought in long ditches and stored in reservoirs above the mines. From these it was conducted down in iron pipes, so that it acquired a great force. When the water issued from the nozzle of the monitor, it could tear down banks of gravel one hundred feet high, and wash great boulders around as though they were little pebbles. The gravels were washed through sluices, and the gold was collected as in placer mining. Quicksilver is often placed in the sluices because it has an attraction for gold and will catch the fine particles.

Quartz mining has to do with getting gold from its original home in veins of quartz. Long, narrow veins of quartz are very abundant throughout the mountains. Some of them reach a thickness of ten to twenty feet, and extend down thousands of feet through the rocks. Shafts are sunk upon such veins as contain enough gold to pay for mining, and from the shafts tunnels are extended along the vein to take out the quartz (Fig. 19). The ore, after being hoisted up the shaft (Fig. 20), is taken to the mill and fed under heavy iron stamps. The stamps crush

FIG. 19.
Miners at work underground.

FIG. 20.
At the mouth of a shaft, showing a skip for bringing up the ore.

the quartz and set the gold free. The little particles of yellow metal are washed on to copper plates covered with quicksilver and are there caught.

Often the gold occurs in iron pyrite, which is a pale yellow mineral scattered through the quartz. After the ore is crushed the pyrite is collected upon a machine called a concentrator. It is then taken to a furnace, and, after being roasted and treated to several other processes, the gold is recovered bright and pure.

The Mother Lode embraces the most important series of gold-bearing quartz veins (Fig. 21) known in the world. An almost continuous series of mining claims is located upon it for more than one hundred miles. The towns of Mariposa, Coulterville, Jamestown, Angels Camp, San Andreas, Jackson, Sutter Creek, Plymouth,

FIG. 21.
Quartz vein near Coulterville. A portion of the Mother Lode.

and Placerville grew up near the Mother Lode in the early days of placer mining, but now they are mainly supported by quartz mining. But the gold belt is not confined to what is usually termed the Mother Lode. A group of important mines is located in the vicinity of Grass Valley. Farther north are the old mining towns of Downieville, Oroville, and Quincy.

FIG. 22.

The Grizzly Giant. Mariposa grove of Big Trees.

The most important hydraulic mines of the Sierra province are found in Calaveras, Eldorado, Stanislaus, Placer, Nevada, Yuba, and Plumas counties. In the pioneer days the population of the gold belt was much greater than now. As the placer mines became worked out the population drifted away, but at the present time it is again increasing.

Forests and Lumbering. — The forests are divided into different belts (p. 21). The one in which the sugar pine, fir, spruce, and Sequoia predominate is the most remarkable. No other coniferous forests in the world are equal to those covering the western slope of the Sierra Nevada

and Cascade ranges. Many of the trees attain a height of 250 feet, with smooth trunks for more than 100 feet. The "Big Trees" and the redwood of the Coast Ranges represent the only surviving species of a once widely distributed genus. The Big Trees are scattered in groves along the Sierra Nevada, at an elevation of 6000–8000 feet, for a distance of 250 miles. This tree reaches a height of over 300 feet, with a thickness at the base of 30

FIG. 23.
The timbering in a mine.

feet. Some of these trees are thought to be over 4000 years old (Fig. 22).

For years these noble forests have been wasted through the careless methods of the lumbermen. A portion of the area covered by the Big Trees is now included within the national and state parks.

The lumber interests of the state are important, but our Big Trees, the last of an ancient race, and the wonder of all who see them, should be preserved. Where the lumbering of other forest trees is carried on, it should be

under intelligent supervision. The forests of California were originally extensive, but care is needed, or between the fires and the lumbermen, it will be only a few years till they are exhausted.

The lumber of the Sierra forests is in demand, not only for building purposes, but for use in the mines, where thousands of logs are used annually (Fig. 23). Lumbering in the Sierra is carried on in an interesting manner. The logs cannot be sent down the streams in most places, nor is it profitable to haul the lumber to market upon wagons. Consequently V-shaped flumes of plank are constructed, which wind around the mountains, upon a uniform grade, until they reach the Great Valley. The mills are located in the forests at the head of the flume, and the lumber, as fast as it is sawed, is thrown into the flume and borne by the water down to the valley.

Other Occupations. — Ever since stock-raising became an important industry in the state, cattle and sheep have been pastured in the mountain valleys. The cattle are driven up to their ranges in the larger valleys and left until fall, when they are taken back to the Great Valley. In the elevated valleys of the northern Sierra Nevada, dairying has long been an important industry. The meadows are green all summer and, with the cool air and pure water, afford conditions for making the best butter. The only difficulty lies in the fact that these valleys are a long distance from market. Because of this, much of the butter is pickled, that is, placed in brine, so that it will keep until fall and winter.

Sheep, in immense numbers, have been pastured upon the public domain in the Sierra Nevada Mountains. The herder starts out in the spring from one of the lower

valleys with his flock of one to two thousand sheep, several dogs, and pack-animals, and works his way slowly up the mountains as summer comes on. With the melting of the snows in the upper valleys he reaches, in late summer, the most remote and rugged portions of the mountains, where, under the almost perpetual snowbanks, the sheep find nutritious grasses. As fall approaches, he leaves these high mountain valleys and returns to the stubble fields of the Great Valley.

FIG. 24.
A herder and his flock.

Owing to the settling up of the public lands and the setting aside of large tracts as forest reserves, the ranges for cattle and sheep have been largely restricted. The wool industry in particular has greatly declined. The profits of sheep-raising, as carried on, were generally large, but the threatened decrease of the forest area, especially in the central and southern portions of the state, through the destructive effect of the sheep upon the young trees, resulted in the formation of the forest re-

serves. The destruction of the grasses, shrubs, and trees, which do much to retain the soil and moisture upon the mountains, would result in greater winter floods and less flow of water during the summer, when it is so much needed for irrigation.

The foot-hills, up to an elevation of four thousand feet, are well adapted to general agriculture and fruit-raising.

FIG. 25.
A scene in the high Sierra Nevada, Mt. Brewer in the middle background.

Apples in particular reach perfection of quality and flavor only in the cooler climate of the mountains.

No more pleasant and agreeable climate is found anywhere than that of the foot-hills at an elevation of three to four thousand feet.

The Great Cañons. — Many deep cañons have been cut out by the streams flowing down the slopes of the Sierra Nevada Mountains, but the most wonderful of all is the

Yosemite Valley. The scenery of this valley is so remarkable that it is renowned over all the world, and each year it is visited by thousands of people.

The Merced River, aided somewhat by the glacier that once descended its valley, has eroded a channel through the granite more than three thousand feet deep. Where the Yosemite lies, the cañon has widened out to three-fourths of a mile. The bottom is nearly level, and dotted with meadows and forests through which the river winds. Bounding the valley are vertical walls over which tumble several mountain streams from such a height that the water is sometimes turned to spray before it reaches the bottom. The Merced River enters the valley by two noble falls, and higher in the mountains are many beautiful lakes which feed the streams.

FIG. 26.

Tehipite Dome rising 3300 feet above Tehipite Valley. Middle fork of Kings River.

Twenty-five miles northwest of the Yosemite is Hetch Hetchy Valley, formed in a similar manner by the Tuolumne River. Its cliffs are not so high nor its waterfalls so picturesque as the Yosemite.

Nearly as grand as the Yosemite, but lacking its magnificent waterfalls, are the cañons of Kings River. They

are reached only by steep and rugged trails. Kings River cañon is the term applied to the south fork of Kings River, where it is enclosed in magnificent granite walls. The cañon of the middle fork of Kings River is, if anything, more grand than the south fork. It is known as Tehipite, from the great granite dome which rises so precipitously from its northern side (Fig. 26).

The Former Glaciers. — Perpetual snow is found along the crest of the Sierra Nevada Mountains, and upon the north sides of some of the highest peaks small glaciers

FIG. 27.

Granite grooved and polished by a former glacier. Glen Alpine, near Lake Tahoe.

still exist. A few thousand years ago the higher portions of these mountains were covered with a thick mantle of snow and ice. Great glaciers gathered in the basins at the heads of the streams and moved slowly down their

cañons. The ice was, in many places, nearly half a mile deep, but melted before reaching the Great Valley. The ice ground and polished the granite ridges (Fig. 27) over which it passed, tearing away many pieces of the rock, which were carried along and dropped upon the sides or at the end of the glaciers, thus forming the ridges which are called moraines. The loose rock and soil having been scraped off the high Sierra, it was left a region of barren granite surfaces over which only a scanty forest has obtained a foothold.

Lakes. — Many hundreds of beautiful lakes dot those portions of the Sierra Nevada which were formerly occupied by the glaciers, and nearly all are present there because of the work of the glaciers. Some of these lakes occupy solid rock basins dug out by the glaciers, while others were formed by the morainal dams which they left across the valleys.

Lake Eleanor, north of Hetch Hetchy Valley; Tenaya, above the Yosemite; East and Bullfrog lakes, at the head of branches of the south fork of Kings River; are among the most beautiful lakes upon the western slopes.

The largest and most widely known lake is Tahoe, at the head of the Truckee River, upon the eastern slope. This lake has a length of twenty three miles and an elevation of more than six thousand feet above the sea. Tahoe is not a glacial lake, but was formed long ago as the result of a lava dam across an ancient valley.

Water Supply, Water Power, Recreation. — The streams of the Sierra Nevada, rising in a region of great precipitation and almost perpetual snow, maintain a considerable flow of water through the summer. This water, par-

ticularly toward the southern end of the Great Valley is largely used in irrigation.

The rapid descent of the streams through the cañons makes them valuable as sources of power for manufacturing, mining, and electric lighting. Owing to the inaccessibility of these cañons manufacturing cannot be conveniently carried on near the source of power; but with the system of electric transmission coming into use, the power can be conducted a great distance. Already plants for the transformation of the water power into electrical energy have been established upon many of the streams, and the electricity is being conducted to the adjoining cities in the Great Valley, and even as far as the San Francisco Bay region.

The elevated Sierran province, valuable as it is from an economic standpoint, is destined to become more and more important as a healthful and pleasant place for summer recreation. These mountains are already the resort of thousands while the valleys below are passing through the hot season.

The Great Valley Province

Physiography and Climate. —The Great Valley lies in the very heart of the state, completely surrounded by mountains save for the narrow outlet at the strait of Carquinez (Fig. 41). The valley forms the largest tract of level land in the state, and is really a plain four hundred miles long and fifty miles wide. It is a very old valley and was formed by a bending downwards of the earth's crust. It has been, at different times in its history, an arm of the ocean, a brackish or fresh water lake, and dry land.

The surface of the valley is made up partly of delta

deposits left by the streams, and partly of sediments deposited in a lake or arm of the ocean. The central part of the valley is filled with material of this kind to a depth of more than two thousand feet.

The last sinking of the land caused the ocean to enter the valley, flooding the lower portion. The surface rises slowly from this area of lowlands and marshes through the opposite arms, the Sacramento and San Joaquin valleys. The Sacramento Valley for many miles has such a gentle grade that the river has built up its channel so that the immediate banks are higher than the land lying back. Whether a stream erodes a channel or deposits material depends upon the slope of the land, the amount of water, and the quantity of sand and clay which it is carrying along.

Many of the streams have built extensive débris fans or deltas. This is particularly the case with those in the San Joaquin Valley. A study of the map shows that the Kern, Kaweah, and Kings rivers upon leaving the mountains split up into a number of branches. The grade of the streams is slight, and they are loaded with débris so that they are continually filling up their channels and making new ones. The Kings River has thus built a débris fan which has been extended completely across the valley to the Coast Ranges. This made a shallow basin to the south, in which a large body of water known as Lake Tulare formerly existed. The lake has now disappeared, owing to the use of the water for irrigation. Buena Vista Lake, near the southern end of the valley, was formed in a similar manner by the delta of the Kern River.

Only one elevation of note breaks the surface of the Great Valley. This is a group of ancient and much

eroded volcanic peaks, in the Sacramento Valley, known as the Marysville Buttes.

The climate of the Great Valley is very warm in the summer, and in winter the average temperature is but slightly below that of Southern California, so that oranges can be grown in many portions without any trouble. In winter there is a good deal of fog, this being the exact opposite of the coast region, where fog is more prevalent in summer.

FIG. 28.
Irrigating canal, Kern Co.

The rainfall decreases from the north toward the south, and is less along the western side, owing to the cutting off of the ocean winds by the Coast Ranges, than it is toward the foot-hills of the Sierra Nevada. The annual rainfall at Red Bluff averages twenty-five inches, while at the southern end of the San Joaquin Valley it is six inches or less. In the southern portion of the valley irrigation is necessary for the successful growing of crops. In the Sacramento Valley most crops can generally be depended on without irrigation, but for the growing of citrus fruits

it is necessary at all points. The effect of elevation upon rainfall is strikingly shown in the contrast between the arid valley south of Bakersfield and the fertile and picturesque surroundings of old Fort Tejon, upon the mountains adjoining, at an elevation of twenty-five hundred feet.

Resources. — The oldest settlements are in the Sacramento Valley. For many years the chief industry was stock-raising, although on the Bidwell ranch, near the present town of Chico, orchards were set out shortly after the discovery of gold. Later, sheep were introduced, and afterward came the period of grain-growing. For hundreds of miles the valley is one almost continuous grain field. The greater portion of the valley is still given over to grain, but orchards and vineyards have replaced it over large areas where the climatic conditions are suitable and water is convenient for irrigation.

By the use of water the light soil of the deltas of the Kern (Fig. 29), Kaweah, and Kings rivers have been made very productive. Dairying has also become an important industry. Cattle now, instead of wandering over miles of half-barren country, are supported by the great fields of alfalfa.

FIG. 29.
The fertile delta of the Kern River.

It has been found that the climate and soil of a part

of the Great Valley are adapted to the growing of the fruits which have made Southern California so noted. Oranges do particularly well along the eastern side of the valley, and in the edge of the foot-hills as far north as Red Bluff. Oranges ripen several weeks earlier than they do in Southern California. Lemons, figs, almonds, and grapes do equally well and are raised in large quantities. The foot-hills are particularly adapted to olives, apricots, peaches, and pears. The bottom lands are devoted to alfalfa, and the broad stretch through the centre of the valley mainly to grain. The overflow lands at the junction of the Sacramento and San Joaquin rivers were originally covered with tules. Large portions of these lands are now protected by levees, and produce luxuriant crops of grain and vegetables.

Coal is found at Ione, and at Lincoln there are valuable deposits of clay suitable for pottery.

Chief Cities. — The locations of the cities of the Great Valley have been determined largely by physiographic conditions. Sacramento was founded in the early days. It is situated upon the Sacramento River, just below the mouth of the American River. It was located at this point because of the easy water communication with San Francisco and its convenience as a point of distribution of supplies to the mines. The city was the starting-point of the overland travel, and for a time the terminus of the Pacific Railroad.

Sacramento is in the heart of the early fruit belt, and a large proportion of the deciduous fruits of the state are grown in the surrounding districts. Thousands of carloads of fruits, berries, and vegetables are shipped east from this point. Sacramento is one of the chief manu-

facturing cities of the state and contains the extensive car shops of the Southern Pacific Railroad. Owing to its location at what is practically the head of navigation for large boats, its rich adjoining country, and its convenience as a shipping point, Sacramento must continue to be one of the chief cities of the state.

Marysville is situated at the junction of the Yuba and Feather rivers. It early assumed importance as a distributing point for the mines. Then it could be easily reached by steamer, but now navigation is more difficult because of the shoaling of the streams.

FIG. 30.
The capitol building at Sacramento.

Chico is surrounded by fruit ranches, the most important of which is the Bidwell ranch. A little farther up the valley is the famous Stanford vineyard, the largest in the world.

Red Bluff is situated at the extreme head of steamboat navigation on the Sacramento River.

Redding, at the upper end of the valley, is the centre of an important fruit and mining region. It is growing rapidly, owing to the development of both gold and copper mines.

Oroville, the county seat of Butte County, is the centre

of the orange industry in the Great Valley. Near this place were some of the richest of the early placer mines.

Stockton, at the lower end of the San Joaquin Valley, owes its importance to the fact that it is situated at the head of tide-water navigation, in the heart of a rich and highly cultivated district. It is an important shipping-point for grain, fruit, and vegetables. Stockton is noted for its flour mills. Grain is brought in upon the cars, is made into flour, and shipped by river steamer to San Francisco, where it is transferred to ocean-going boats. The lowlands along the water courses below Stockton

FIG. 31.
Flour mills at Stockton.

are especially noted for their production of potatoes and asparagus.

Fresno is the largest city of the central San Joaquin Valley. It owes its location to the Kings River, which, issuing from the mountains, spreads out in many branches over its great delta, and affords excellent opportunities for irrigation. Grain was formerly the main product, but now there are extensive vineyards and orchards. Fresno is noted for its raisins, and is the centre of this industry in California.

Bakersfield is near the southern end of the San Joaquin Valley. The climate of this portion of the valley is very dry, but with irrigation the lands produce abundantly. The city is located near the Kern River a little below where it issues from the mountains. The river supplies the water for irrigation in this district. Bakersfield was formerly the centre of the cattle and sheep industry of this part of the state. The region about is now noted for its oil wells, the product of oil from this field being larger than that from any other in the state. The petroleum is used largely in steam engines, for like most of that found in California, it is thick and not so good for illuminating purposes as the eastern oil. When refined it is the source of many by-products, such as gasolene, benzine, paraffin, and lubricating oils.

Province of the Coast Ranges

Physiography and Climate. — The relief map shows that the state is bordered upon the coastal side by an almost continuous series of mountains. These are depressed in the San Francisco Bay region where the Great Valley finds outlet, and retreat somewhat from the ocean in Southern California, leaving room for the plain of Los Angeles.

The term "Coast Ranges" is usually applied to that portion of the coast mountains lying south of the south fork of Trinity River, and north of the Santa Clara River. The relief map (Fig. 1) clearly shows also that this system of mountains is made up of a number of parallel ranges with valleys between them. The valleys generally open in a northwesterly direction, and as they approach the ocean become very broad.

The direction of the mountains and the recent sinking

SAN FRANCISCO
AND VICINITY.
Places are displayed same as on General Map.
0 1 2 3 4 5 10
10 MILES TO 1 INCH.
SOLANO
MARIN
CONTRA COSTA
ALAMEDA
SAN MATEO
SANTA CLARA
San Pablo Bay
San Francisco Bay
PACIFIC OCEAN
Suisun Bay
GRIZZLY ISLAND
Petaluma Pt.
Navy Yard Observatory
MARE ISLAND
Vallejo
S. Vallejo
Crockett
Port Costa
Martinez
Bay Point
Rodeo
Pinole
Luzon
Pacheco
Concord
Clayton
Penole Pt.
Sobrante
Pt. San Pedro
San Anselmo
San Rafael
Ross
Pt. San Quentin
San Quentin
Mt. Tamalpais
Mt. Tamalpais Tunnel
Blackspur
Point Richmond
Stege
Giant
Pinole
Sobrante Ridge
Walnut Creek
Mt. Diablo
3,856 ft.
Lafayette
Orinda
Bryant
University of California
Berkeley
Tiburon
Belvedere
Sausalito
Angel Island
Alcatraz I.
Emeryville
Oakland
Golden Gate
Pt. Bonita
Fort Pt.
Seal Rocks
City Hall
San Francisco
Alameda
Melrose
Mills College
Elmhurst
San Leandro Bay
San Leandro
Lake Chabot
San Leandro
Dougherty
Hayward
Haywards Sta.
Mt. Eden
Decoto
Alvarado
Niles
Centerville
Irvington
Mission San Jose
Newark
Warmsprings
Redwood City
Menlo Park
Palo Alto
Stanford University
Mayfield
Alviso
Milpitas
Mountain View
Agnew
Lawrence
Santa Clara
San Jose
Ocean View
Colma
South San Francisco
Baden Sta.
Pt. San Bruno
Millbrae
Pt. San Mateo
San Mateo
Pt. San Pedro
San Andreas Lake
Pt. Montara
Montara
Pillar Pt.
Half Moon Bay
Halfmoon Bay
Belmont
Crystal Springs Lake
Danville
San Ramon
Diablo Range
Coast Range
Alameda Cr.
Guadalupe R.
Coyote R.
Sulphur Springs Valley
Suisun Valley
Arsenal
Sulphur Springs Mts.
Gallinas Cr.
Novato
Ignacio
18 ft. depth
36 ft. depth
THE W. H. ENG.

of the land are important facts governing the physiography of the Coast Ranges. The ocean entered the valleys of all the streams. Most of the bays thus formed have been filled with silt, giving the broad and rich bottom lands; the waves have thrown sandbars across the mouths of some, while in the case of San Francisco Bay, the large area flooded has given us a magnificent harbor with easy entrance.

The Coast Ranges rise generally from two thousand to four thousand feet, reaching their greatest height near their northern and southern limits. The Santa Lucia is the most rugged range in the central portion of these mountains. It rises very abruptly from the ocean to a height of four thousand feet, one peak San Lucia reaching nearly six thousand feet.

The Gavilan and Santa Cruz mountains belong to another important range which is depressed in the middle where the Pajaro River crosses it.

A broad group of elevated mountains lies between the Santa Clara and San Joaquin valleys. The eastern portion, forming the main divide of the Coast Ranges, is the Mt. Diablo Range. Mt. Hamilton on the west overlooks the Santa Clara Valley. It rises more than four thousand feet, and is noted as the location of the Lick observatory.

FIG. 32.
Lick observatory, Mt. Hamilton.

Mt. Diablo lies south of the strait of Carquinez and is the most striking landmark seen in the Coast Ranges as one journeys toward San Francisco across the Great Valley.

North of San Francisco there are three important valleys separated by volcanic mountains. The highest peaks are Mt. St. Helena and Mt. Konocti, both rising over four thousand feet.

The summit of Mt. Tamalpais, which rises twenty-six hundred feet, offers the best opportunity for the study of the physiography of the San Francisco Bay region.

The rainfall decreases from fifty-two inches at Eureka to thirteen inches in the valley of the Santa Maria in the southern Coast Ranges. Upon the mountains it is greater. In the eastern portion of the southern Coast Ranges the rainfall is very light, and one large valley, the Carrisa Plain, is without outlet. It has in its centre a salt marsh, and is the only valley of any size without external drainage west of the Great Basin.

The beds of the larger streams of the southern Coast Ranges — the Salinas, the Santa Maria, and Santa Ynez — are nearly dry in the summer, although water can be found beneath the surface.

The summer climate of the immediate coast is cool, owing to the fog which sweeps in from the ocean. The fog is one thousand to fifteen hundred feet thick, and the mountains which rise above it have a normal summer climate.

Resources. —The resources of the Coast Ranges are exceedingly varied, and the climate for the most part is so agreeable that this portion of the state is quite thickly settled. Stock-raising was the earlier occupation upon the old Spanish grants, which embraced nearly all the valuable lands. Large numbers of cattle and much grain are still

produced, but many of the great ranches have been cut up into smaller ones, where diversified farming and fruit-raising are carried on.

The country immediately adjacent to the coast, because of the cool climate and the luxuriance of the grasses, is particularly adapted to dairying. From Eureka to San Luis Obispo, a distance of four hundred miles, dairying is, for this reason, an important industry. The cheese and butter produced are shipped to San Francisco upon the little coasting steamers.

FIG. 33.
Scene in the museum of the Academy of Sciences.

Through the most of the valleys and foot-hills of the Coast Ranges fruit-raising is now the leading industry. Oranges are not grown extensively north of Point Conception, although they do well in some places as far north as the Sonoma Valley. The chief fruits raised are prunes, apricots, peaches, pears, apples, and grapes. The growing of wine grapes is an important industry, especially north of San Francisco. Santa Cruz and Humboldt counties are noted for their apples. A portion of the fruit is shipped fresh to San Francisco and the East. Another portion is dried. The drying is done

munication, both by land and water, with extensive valleys rich in agricultural resources, and mountains filled with minerals.

The southern arm of the bay reaches into the Santa Clara Valley, which is one of the most highly cultivated portions of the state. The northern arm, known as San Pablo Bay, gives access to both Sonoma and Napa valleys, while through the strait of Carquinez (Fig. 41) there is water communication with Sacramento and Stockton.

FIG. 37.
The Ferry Building, San Francisco.

San Francisco is situated upon the eastern side of the peninsula of the same name. The lower part of the city lies partly upon made land, but behind rise rolling and picturesque hills. Between the city and the Golden Gate is the military reservation known as the Presidio, where have been erected the main defences of the city.

North of the city, in the middle of the channel, is Alcatraz Island, a military prison, while near the northern

shore is Angel Island, used for a military post and quarantine station. Goat Island, between the city and Oakland, has a naval school located upon it.

San Francisco has grown mainly because of its commercial position. It is also a manufacturing city of importance, although the high price of fuel has been a drawback. The discovery of rich oil fields and the transmission of electric power from the Sierra Nevada Mountains must make up for the lack of cheap coal, and manufacturing will soon become a much more important factor in the development of the city.

FIG. 38.

The U. S. battleship Oregon. Built by the Union Iron Works.

Among the most extensive manufacturing institutions are the Union Iron Works, noted on account of their construction of cruisers and battleships for the government. As a centre for the manufacture of mining machinery San Francisco is noted. It has also extensive manufactures of shoes, clothing, flour, and canned goods.

The city has beautiful parks, several museums, including that of the Academy of Sciences (Fig. 33), Mining Bureau, and Park Museum. It has a fine art gallery and

important industrial and professional schools. The population (census of 1900) is 342,700, and although little more than fifty years old, the city is one of the leading commercial centres of the United States.

Suburban Cities. — Upon the eastern side of the bay are situated the cities of Oakland, Alameda, and Berkeley. They are easily reached by ferries and local cars. These are essentially cities of homes, for here dwell thousands of men whose work takes them to San Francisco every day. Oakland is the largest, having a population of 67,000 (census of 1900). It is the third city in size in the state. It has a commodious harbor and extensive manufactures. Other manufactures are growing up along the bay as far north as Point Richmond, the land terminus of the Santa Fe Railroad.

FIG. 39.
The Le Conte Oak (live-oak) on the grounds of the University of California.

Berkeley lies north of Oakland at the foot of the Contra Costa Hills. The state University, one of the largest schools for higher education in the United States, is situated there. The University grounds, on the slope of the hills facing the Golden Gate, have great natural beauty. The first of the new buildings in the Hearst architectural plans has been commenced.

North of San Francisco are the pleasantly situated towns of Sauselito and San Rafael.

Tributary Valleys and Cities. — Santa Clara Valley, penetrated by the southern arm of San Francisco Bay, is dotted with orchards of prunes, peaches, apricots, and other fruits, while in the foot-hills are vineyards and apple orchards. This valley is the centre of the prune industry. There are also grown in the valley great quantities of small fruits and seeds.

San Jose is located in the centre of the valley a few miles from the bay. It is the chief city and contains one of the state Normal Schools, while a little to the northwest is the University of the Pacific.

FIG. 40.
A façade, Stanford University.

Between San Jose and San Francisco is situated the Leland Stanford Jr. University. This university has fine grounds, and is erecting a series of large and expensive buildings. It is the most richly endowed university in America.

Sonoma Valley does not drain into San Francisco Bay as might be expected from its position, for Russian River, some distance before reaching the bay, turns westward and passes through the mountains to the ocean. Santa Rosa, the largest city, is situated in the midst of a rich fruit section. The fruit products are diversified, for not

only are there raised those characteristic of the other valleys of the Coast Ranges, but lemons and oranges also have been found to do well in certain localities. The valley is noted particularly for its olives and grapes, and in the upper portion many hops are grown. Petaluma is most noted for its poultry farms.

Napa Valley is not excelled for beauty and richness by any in the state. All the common fruits do well there.

FIG. 41.

Looking down the Strait of Carquinez.

Growing grapes for wine was formerly the leading industry, but now prunes, olives, almonds, apples, and cherries are more important.

The Strait of Carquinez. — The streams of the Great Valley meeting in the marshes a little above Suisun Bay pour their waters through the Strait of Carquinez into San Pablo and San Francisco bays. The Strait marks the inner line of the Coast Ranges, and is practically at the meeting-point of the interior with the ocean traffic, and for this reason is destined to become of great importance

in the development of the state. The hills rise steeply, with deep water at their base, giving excellent opportunities for the loading and unloading of ocean vessels (Fig. 41). Already many manufactures and other industries have grown up along the Strait.

Near Port Costa are extensive grain warehouses, flour mills, lumber yards, and sugar refineries. The Selby smelting works, a little farther down the Strait, is the

FIG. 42.
Sugar refinery, South Vallejo.

largest establishment of its kind in the state. On the north shore of the Strait are the towns of Benecia and Vallejo, with many manufacturing establishments (Fig. 42), and near by is the Mare Island navy yard.

The Northern Coast. — This is a region of forested mountains and narrow valleys. Between the mountains and the ocean there is generally a plain of varying width upon which are situated a number of towns supported by dairying and lumbering. The coastal plain and the valleys adjacent are almost wholly given up to dairying. The long wet season and cool air are particularly favorable.

The industry of greatest importance upon the northern coast is lumbering. The most of the towns have grown up about the sawmills. These have been placed at points on the coast where the logs may be easily gathered, usually

at the mouth of some valley, and where the lumber may be shipped away by boat.

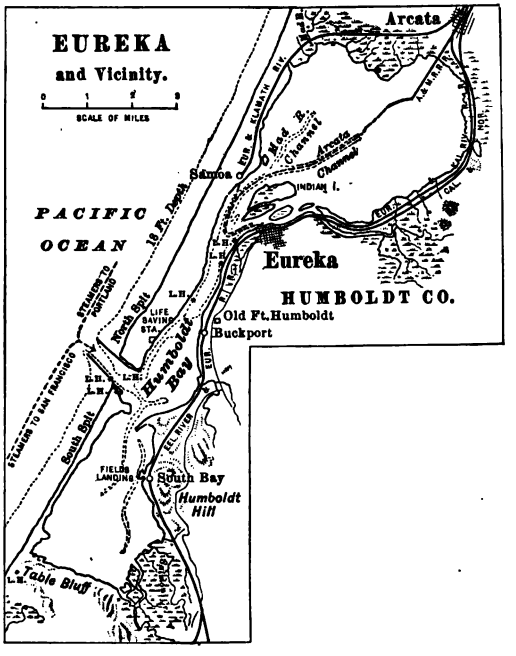
Eureka, situated upon Humboldt Bay near the mouth of Eel River, is the most important city upon the coast north of San Francisco. Here are many sawmills for cutting up the great redwood logs brought by the railroads which branch out into the various logging districts.

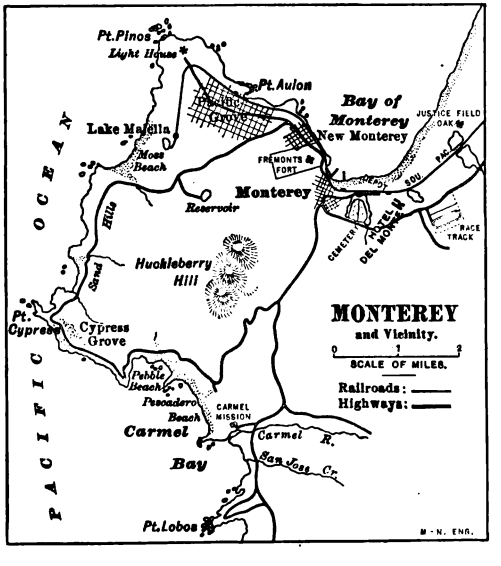
FIG. 43.

Logging in the redwoods.

Here also are extensive shipbuilding plants. The forests of redwood extend back more than twenty miles from the coast, being more dense in the valleys.

Between Eureka and the mountains there is a rich plain, largely given up to dairying. Many orchards, where fruit of an excellent quality is raised, are found in the valleys, back a little from the coast. As a result of its favorable situation, Eureka must become a city of im-


EUREKA
and Vicinity.
SCALE OF MILES
Arcata
Mad R.
Channel
Arcata Channel
Samoa
INDIAN I.
PACIFIC
OCEAN
18 Ft. Depth
Eureka
HUMBOLDT CO.
Old Ft. Humboldt
Buckport
North Spit
LIFE SAVING STA.
Humboldt Bay
South Spit
FIELDS LANDING
South Bay
Humboldt Hill
Table Bluff


Pt. Pinos
Light House
Pt. Aulon
Bay of Monterey
New Monterey
Lake Majella
Moss Beach
Monterey
Reservoir
Huckleberry Hill
Pt. Cypress
Cypress Grove
Pebble Beach
Pescadero Beach
Carmel
Bay
CARMEL MISSION
Carmel R.
San Jose Cr.
Pt. Lobos
PACIFIC OCEAN
MONTEREY
and Vicinity.
SCALE OF MILES.
Railroads:
Highways:
M-N. ENR.

portance. It is connected by steamer and stage with San Francisco, but ultimately will have railroad communication.

The Clear Lake Region. — Clear Lake lies in the heart of the northern Coast Ranges. It is the largest lake in the state west of the Sierra Nevada Mountains. The lake empties through Cache Creek into the Sacramento River, but in quite recent times its outlet was westward, through the cañon in which the Blue Lakes lie, into Russian River.

The Clear Lake region is widely known for its beauty and its many mineral springs. The mountains about the southern side of the lake, of which Mt. Konocti is the highest, are of volcanic origin. The mineral springs and quicksilver deposits in this portion of the Coast Ranges are the result of the last volcanic outbreaks. Sulphur Bank, at the eastern end of Clear Lake, is interesting on account of its deposits of both quicksilver and sulphur. Here can be seen the way in which Nature formed the deposits of these minerals, which are found so extensively in California. In fact, Nature is still forming them here. Through the fissures in the rocks issue gases and hot waters carrying various minerals in solution.

Fruit-growing, especially grapes, and the raising of stock are the most important industries.

Monterey and Surroundings. — Great historic interest centres about the town of Monterey, the old Mexican capital of California. The custom-house, from which Commodore Sloat hauled down the Mexican flag, is still standing. There are also other adobe buildings of historic interest.

Here we see plainly the influence of physiography upon the growth of cities. Monterey, though founded before

San Francisco, and for a time the capital and second city in importance, owing to its rather isolated position and lack of easy communication with the interior has felt but little the influences of those causes which made San Francisco a great city.

To the west of Monterey is the Point of Pines, near which are the noted groves of cypress. Between the Point and Monterey is Pacific Grove, the most picturesque and delightful of all the summer or winter resorts along the

FIG. 44.
Old Mexican custom-house, Monterey.

coast. South of Monterey, upon the shores of Carmelo Bay, is the second oldest mission in the state (Fig. 44).

The Valleys of the Southern Coast Ranges. — The Salinas Valley forms the main highway into the southern Coast Ranges. From Watsonville, with its apple orchards, one enters the Salinas Valley, where there are great stretches of lowland devoted to sugar beets, and the largest beet-sugar factory in California (Fig. 45). The valley narrows farther up and becomes very dry. Then it widens out in a broad and extensive region devoted

largely to grain. Still farther, toward the head of the valley, are many orchards.

From the beautiful Santa Margarita Valley one goes by the Cuesta Pass across the Santa Lucia Range to the broad, rich valley in which the town of San Luis Obispo lies. This is one of the most attractive regions of the Coast Ranges on account of its climate, scenery, and variety of productions. A series of high peaks, known as

FIG. 45.

Spreckels' beet-sugar factory, Salinas Valley.

the San Luis Buttes, extend northwest from the town to the ocean, where it terminates in Morro rock, a bare, rocky island rising almost precipitously to an elevation of nearly six hundred feet (Fig. 46).

Farther south is Arroyo Grande, a valley of orchards, and beyond that the valley of the Santa Maria, covered with grain fields and orchards. The most important stream of Santa Barbara County is the Santa Ynez River.

Beans are extensively raised in the lower part of the valley, near the town of Lompoc.

Toward the upper portions of the basins of all the streams of the southern Coast Ranges the mountains are rugged and partly wooded. They are therefore largely devoted to the raising of cattle.

The southern Coast Ranges, particularly in San Luis Obispo County, are noted for their extensive deposits of bituminous rock. This substance is formed by a thick,

FIG. 46.
Morro Rock.

dark petroleum, which looks much like tar, slowly oozing up from deep in the rocks and soaking into beds of soft sandstone. The dark, sticky substance thus formed is of great value in giving a smooth, hard surface to roads. It is used more or less in the pavements of all the cities of the state.

SOUTHERN CALIFORNIA PROVINCE

Physiography and Climate. — Under the term "Southern California" is included all that portion of the state lying south of the watershed extending from Tehachapi

Range west through the Santa Ynez Range to Point Conception. This province contains about one-third of the population of the state.

Southern California has two slopes: one southwest to the ocean, and the other east and northeast into the Great Basin. With the exception of Antelope Valley, at the west end of the Mohave Desert, and portions of the Colorado Desert, the cultivated lands of Southern California lie upon the seaward slope.

Point Conception, near the western end of the Santa Ynez Range, marks an abrupt change in the direction of the coast. This range belongs in the coast system, but the mountains farther inland, extending in the same direction, but lying between the Mohave Desert and the cultivated portions of Southern California, are known in general terms as the Sierra Madre. The middle portion of this great mountain block is called the San Gabriel, and the eastern portion the San Bernardino Range. Grizzly Peak, in the latter range, which rises over 11,500 feet, is the greatest elevation of Southern California.

South of the San Bernardino Range, across the San Gorgonio Pass, rises the steep slopes of Mt. San Jacinto. This mountain stands at the northern end of the Peninsula Range, which extends south across San Diego County into Lower California.

The Santa Ana Range separates the broad valleys at the western base of Mt. San Jacinto from the ocean. Its steep eastern slope, like the southern face of the Sierra Madre and the slopes of San Jacinto, is the result of fissures in the earth's crust, the crust upon one side having been raised and upon the other dropped. Lake Elsinore lies in a basin caused by the sinking of the land.

The Santa Ana Mountain axis extends northerly, forming the Puente Hills, and rises again in the Verdugo Mountains, north of Los Angeles. Reaching westward from Los Angeles is the Santa Monica Range, which appears to be a continuation of the submerged range represented by the Channel Islands.

Southern California is completely shut off from the rest of the state by mountains. Upon the east there is but one low pass, the San Gorgonio, through which the Southern Pacific Railroad has been built. The Cajon pass, by means of which the Santa Fe gains access to Southern California, marks a noted depression in the Sierra Madre. The old Salt Lake trail went through this pass.

Farther west there are two passes leading north into the Mohave Desert. One of these, the Soledad Pass, is utilized by the Southern Pacific, which, after crossing the desert, reaches the Great Valley by the Tehachapi Pass. West of the Soledad Pass is the Francisquito Pass, once used by the old stage line from Los Angeles to Bakersfield. The only wagon road leading north, which does not take one into the deserts, is by Ventura and Santa Barbara.

The broad coastal plain upon which Santa Barbara stands is shut in by mountains. The Santa Clara Valley of Ventura County is also hemmed in by mountains. San Fernando is an important valley separated from the plain of Los Angeles by the Santa Monica Range.

The Los Angeles plain is the largest area of nearly level land in Southern California. It is separated by low hills from other valleys to the east along the foot of the Sierra Madre. The extensive region of low relief, of which Riverside is the centre, is one of very ancient mountains nearly worn away.

Southern California has the typical physiographic features of the arid region. It is important to distinguish the three main types. There is (1) the mountains with more or less precipitous rocky sides, (2) the long, gently inclined slopes about the bases of the mountains made up of the waste which the water has carried into the valleys, and (3) the river bottoms of sand and alluvium. Each of

FIG. 47.

Orange groves in Southern California, snowy mountains in the distance.

these divisions has its economic value. The mountains condense the moisture which furnishes the water supply through the long summers. The waste slopes (Fig. 47) are easily irrigated and possess the proper climate for raising subtropical fruits, while the bottom lands, cooler and more moist, are adapted to alfalfa, berries, and vegetables. If it were not for the high mountains, there would be little water for irrigation, and Southern California would be a semi-desert.

Much of the plain of Los Angeles and also the mesa lying between the mountains and the ocean, in the vicinity of San Diego, were formed under the ocean when the land was submerged. The streams of Southern California present curious features. They appear larger near their heads than at their mouths. This is because of the long distance which they have to flow over sandy beds exposed to the hot sun. The sand takes up

FIG. 48.
Drying English walnuts in Orange County.

much of the surface water, but it can always be obtained in wells.

The climate near the coast is remarkably mild and uniform. Fogs occur in summer, but they are not as cold as farther north. As one goes inland the changes between winter and summer, and day and night, become much greater. Snow covers the mountains in winter, while a short distance below orange trees are in blossom (Fig. 47).

The rainfall increases with elevation. The rainfall of any locality is less if mountains lie between it and the ocean.

Resources. — Southern California is most noted for its orange groves and pleasant climate. A few years ago the orchards were mostly confined to the gardens about the old Spanish towns and missions. Oranges were first grown upon an extensive scale at Riverside. It is now known that there is a large area suitable for the raising of

FIG. 49.
Threshing beans in Ventura County.

fruit; the amount produced need be limited only by the amount of water available for irrigation.

In addition to the citrus fruits, figs, olives, grapes, and walnuts are extensively grown. Alfalfa does well upon the lowlands, and near the ocean, in Orange County, these lands are largely given over to growing celery (Fig. 50). Fully a thousand car-loads are shipped East yearly.

Beans form the most important crop near the ocean, especially in Ventura and Santa Barbara counties. Much grain is grown in the larger valleys, where water is not

FIG. 50.
Celery fields in Orange County.

available for irrigation; and upon the lands of those old Spanish grants which have not been cut up, many cattle and sheep are kept.

Southern California is noted for its large production of honey. Bee ranches (Fig. 51) are scattered through the cañons, where the white sage abounds, for the flowers of this bush make excellent honey.

FIG. 51.
A bee ranch in Southern California.

Gold is found in the mountains, especially in San Diego and northern Los Angeles counties. There are valuable deposits of pottery clay and some coal near Elsinore.

The most important mineral product is petroleum. The oil fields are found in the Puente hills, in the city of Los Angeles (Fig. 52), and through nearly the whole of the mountains bordering the Santa Clara River, in Ventura County. In Santa Barbara the Summerland field, in the

FIG. 52.
Oil wells in the city of Los Angeles.

edge of the ocean, is an interesting one. There are also near Santa Barbara extensive deposits of asphaltum and bituminous rock.

Irrigation. — A large portion of California has so little rainfall that it cannot be thickly settled and developed without irrigation. The central and southern parts in particular require the artificial application of water to the

soil. Lands which originally supported only a few half-starved cattle have, with the turning of the mountain streams upon them, become veritable gardens and capable of supporting a large population.

The streams carry more water in the winter than is needed for irrigation, and to preserve this surplus reservoirs have been constructed at favorable points near their headwaters. These hold back much of the water until summer, when it is used as needed. Where the streams issue from the mountain cañons the water is taken out in ditches or pipes and conducted around the hillsides at a uniform grade until the area to be irrigated is reached (Fig. 53). The gently inclined waste slopes about the mountains have the best climate and soil for fruit growing and are easily watered.

FIG. 53.
Water for irrigation is often conducted around the mountain sides in a flume.

The large ditch is divided into smaller ones, which lead to the different orchards. Furrows are made between the rows of trees, and the water is allowed to flow through these until the ground is thoroughly soaked. Each orchard has the use of a certain amount of water, after which it is turned off and taken to the next one. This process has to be repeated several times during the summer to keep the trees in good condition.

Santa Barbara and Vicinity. — Santa Barbara is pleasantly situated near the eastern end of a broad coastal plain lying between the Santa Inez Mountains and the ocean. The region is protected by high mountains upon the north, while seaward rises the picturesque Channel Islands. For this reason the climate is mild and pleasant. Oranges are grown here, but the main fruits are olives and walnuts. West of the city is one of the largest olive orchards in the world. Santa Barbara has become noted as a tourist resort.

Valley of the Santa Clara River. — Ventura is the chief city of this section. It lies near the ocean upon the borders of a large and rich valley. In the lower portion of the valley large quantities of beans are grown, while farther up are orchards of oranges and other fruits. Near Peru is one of the largest fig orchards in the state.

The oil fields adjacent to the valley are the oldest in the state. The oil is carried to Ventura in pipes and from there shipped by boat. Some of the oil wells are more than half a mile deep. In places oil is obtained by running tunnels into the sides of the mountains. There are also large springs of thick, tarlike oil accompanied by disagreeable-tasting mineral waters. In the Eastern states petroleum generally flows from the wells, but here it has to be pumped.

The oil comes from shales, which were formed long ago in the bed of the ocean. The shales consist largely of the remains of microscopic organisms whose bodies, as they sank to the bottom, gathered in beds, and at last, buried deeply under other beds, gave up a part of their organic matter in the form of the dark, thick oil which we call petroleum. This oil soaked into sandstones, which are

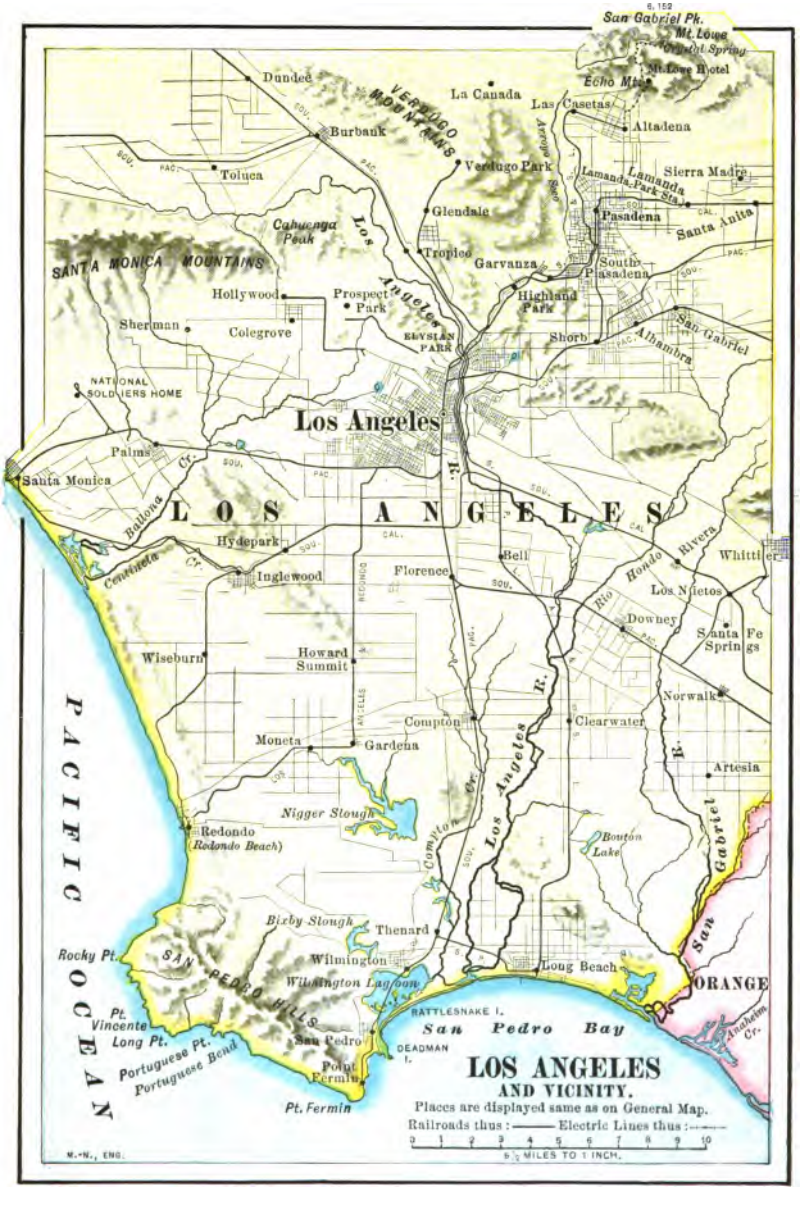
more porous than other rocks, and there the well-driller finds it. Petroleum has no relation to coal, which is formed from the remains of the vegetation of swampy or marshy places.

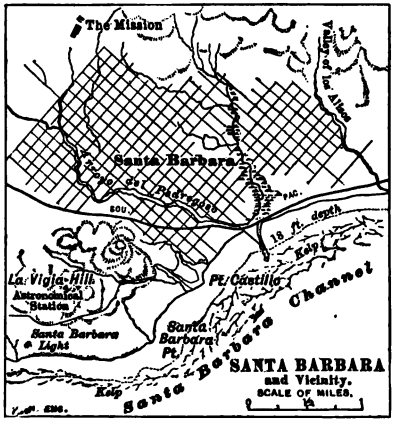
Los Angeles and Vicinity. — No other city in California, except San Francisco at the time of the discovery of gold, has had so rapid a growth as Los Angeles has had since 1880. The pueblo of Los Angeles was founded about 1780. Its location is upon the west bank of the Los Angeles River, a little below where it issues from the hills on to the extensive plain which stretches south and west to the ocean.

In 1880 Los Angeles had a population of only one thousand. It had hardly broken away from the easy life of Spanish California. Then came a period of awakening, with an influx of people into Southern California. Los Angeles had always been the most important centre of this portion of the state, and when the advantages of Southern California became understood, the city, because of its central location and convenience as a railroad centre and distributing point, began to grow rapidly. In 1900 it had gained a population of over one hundred thousand.

FIG. 54.
A home in Los Angeles.

Los Angeles has a pleasant climate, blending the coolness of the ocean and the heat of the interior. For miles


San Gabriel Pk.
Mt. Lowe
Crystal Spring
Mt. Lowe Hotel
Echo Mtn.
Dundee
La Canada
Las Casetas
Altadena
Burbank
VERDUGO MOUNTAINS
Verdugo Park
Arroyo Seco
Lamanda
Lamanda Park Sta.
Sierra Madre
Toluca
Glendale
Pasadena
Santa Anita
Cahuenga Peak
Los Angeles R.
SANTA MONICA MOUNTAINS
Tropico
Garvanza
South Pasadena
Hollywood
Prospect Park
Highland Park
Sherman
Colegrove
ELYSIAN PARK
Shorb
Alhambra
San Gabriel R.
NATIONAL SOLDIERS HOME
Los Angeles
Palms
Santa Monica
Ballona Cr.
L O S A N G E L E S
Hyde park
Centinela Cr.
Inglewood
Florence
Bell
Rio Hondo
Rivera
Whittier
Los Nietos
Downey
Santa Fe Springs
Wiseburn
Howard Summit
Norwalk
Compton
Clearwater
Moneta
Gardena
Artesia
Nigger Slough
Redondo (Redondo Beach)
Compton Cr.
Los Angeles R.
San Gabriel R.
Bouton Lake
Bixby Slough
Thenard
Rocky Pt.
SAN PEDRO HILLS
Wilmington
Wilmington Lagoon
Long Beach
ORANGE
PACIFIC OCEAN
Pt. Vincente
Long Pt.
Portuguese Pt.
Portuguese Bend
RATTLESNAKE I.
San Pedro Bay
San Pedro
DEADMAN I.
Point Fermin
Pt. Fermin
Anaheim Cr.
LOS ANGELES
AND VICINITY.
Places are displayed same as on General Map.
Railroads thus: —— Electric Lines thus: ——
0 1 2 3 4 5 6 7 8 9 10
5½ MILES TO 1 INCH.
M.-N., ENG.


The Mission
Valley of the Mission
Santa Barbara
18 ft. depth
Kelp
La Vigia Hill
Astronomical Station
Santa Barbara Light
Pt. Castillo
Santa Barbara Pt.
Santa Barbara Channel
Kelp
SANTA BARBARA
and Vicinity.
SCALE OF MILES.

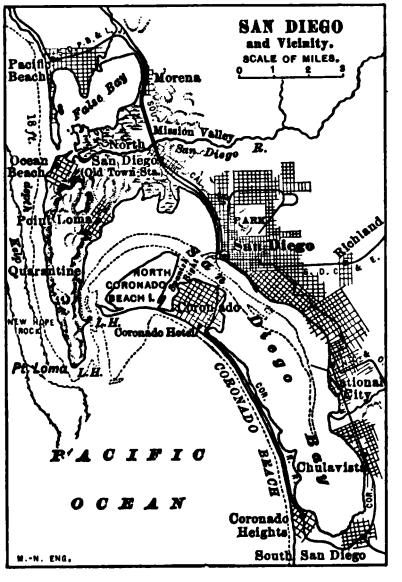

SAN DIEGO
and Vicinity.
SCALE OF MILES.
Pacific Beach
False Bay
Morena
Mission Valley
San Diego R.
Ocean Beach
San Diego (Old Town) Sta.
Point Loma
PARK
San Diego
Richland
Quarantine
NORTH CORONADO BEACH L.
Coronado
Coronado Hotel
NEW DEPT ROCK
Pt. Loma L.H.
San Diego Bay
CORONADO BEACH
National City
PACIFIC
OCEAN
Chulavista
Coronado Heights
South San Diego

FIG. 55.
City of Riverside.

in every direction there are rich lands adapted to a great variety of products. The location of the ancient pueblo was determined by the abundance of water for irrigation and not for its commercial advantages, for it is twenty-five miles from the small harbor of San Pedro. An extensive breakwater is being constructed at that place, which will make a roadstead for large vessels. Santa Monica lies upon the ocean, fifteen miles west of Los Angeles; Redondo is southwest, San Pedro and Long Beach south. These are all important summer resorts.

FIG. 56.
An artesian well, Orange County.

A few miles northeast of Los Angeles, at the foot of the San Gabriel Range, is the beautiful city of Pasadena,

which is widely known for its healthful and pleasant climate. The development of the fruit industry has produced other cities to the south and east. Among the most important of these are San Bernardino, Riverside, and Santa Ana. About Riverside can be seen most clearly the transformation which water has accomplished in a dry and semi-arid region. Lands originally covered with scattered bushes, and of scarcely any value even for grazing purposes, are now dotted with orange and lemon orchards and pretty homes.

Santa Ana lies south of Los Angeles. The region about is very fertile and abundantly supplied with water, much of which comes from artesian wells. Upon the lowlands of the Santa Ana River large quantities of sugar beets, celery, and alfalfa are grown.

San Diego. — The oldest settlement in the state is upon San Diego Bay. It is now known as Old San Diego. The present city is situated upon the bay four miles to the south. San Diego Bay is, next to San Francisco, the most commodious and safe harbor upon the coast of California. For this reason the city of San Diego is destined to become one of the most important commercial centres of the state.

In the valleys back of San Diego there are many orange and lemon orchards, and vineyards where the raisin grape is grown. At Chula Vista, near San Diego, is the largest lemon orchard in the world. The apples produced in the mountains of San Diego County are the best in Southern California.

Upon the Coronado Peninsula is one of the most attractive winter resorts upon the coast of California. San Diego has a particularly mild and uniform climate.

Appropriate to Southern California are the lines from the song of Mignon : —

> "Know'st thou the land where the lemon trees bloom,
> Where the gold orange glows in the green thicket's gloom,
> Where the wind ever soft from the blue heaven blows,
> And groves are of myrtle, and olive, and rose?"

The Province of the Klamath Mountains

Physiography. — Under the title of Klamath Mountains is included a group of irregular mountain ranges in northwestern California and southern Oregon. These mountains are continuous with the Coast Ranges to the south but are higher and more rugged. In places they reach an elevation of over nine thousand feet. They are mostly composed of very old rocks, like the Sierra Nevada, and resemble it also in their physiographic features and mineral resources.

The most lofty of the ranges included in the Klamath Mountains are the Salmon, Siskiyou, Trinity, and Scotts mountains. The whole area is traversed by deep and narrow cañons with few valleys of any size. Upon the eastern side of the Klamath Mountains, and partly separating them from the volcanic peaks of the Cascade Range, is Shasta Valley, while within the mountains are Scotts, Trinity, and Hayfork valleys.

The most important river is the Klamath. It rises in the Klamath lakes of southern Oregon and flows southwesterly in a deep cañon directly across the Klamath Mountains. Its main tributary is the Trinity River. The Sacramento River rises near Mount Shasta and flows across the eastern part of the Klamath Mountains in a

picturesque cañon, which gives a direct and convenient pass for the railroad as far as Shasta Valley. The Siskiyou Mountains join a spur of the Cascades upon the northern boundary of California, so that entrance to Oregon is made difficult, both for railroad and wagon road.

Mineral springs abound in the cañon of the Sacramento, and it is occupied by many camping parties during the summer months. The McCloud, farther east, is another picturesque river, which is fed by underground streams from Mount Shasta.

FIG. 57.
Sugar pine forest.

Natural Resources. — Gold-bearing quartz veins are found throughout nearly all portions of the Klamath Mountains. Mining is therefore the chief industry. Extensive deposits of gravels left by the ancient streams are found along the sides of the valleys and cañons. These contain so much gold that hydraulic mining has been more important than quartz mining. Copper is an important mineral product of the Klamath Mountains. At Iron Mountain, a few miles northwest of Redding, is the largest copper mine in California. Smelters for reducing the ore and recovering the metallic copper have been erected at Keswick upon the Sacramento River. Other large copper deposits occur at Copper City, north of Redding. The water flowing from these mines contains copper in solution,

and if pieces of scrap iron are left in it for a time, they become covered with bright metallic copper.

Lumbering stands next to mining in importance. The mountains are usually forested, but the most of the mills are located near the head of the Sacramento.

With the exception of the three or four valleys of the Klamath Mountains already mentioned, there is but little land suitable for agricultural purposes or fruit-raising. The fruits of the temperate climate raised here are excellent, especially the apples. The chief towns are Yreka, Weaverville, and Dunsmuir.

Volcanic Plateau Region. — The volcanic plateau region of northeastern California embraces Lassen, Modoc, and a large part of Shasta and Siskiyou counties. It is drained mainly by the Pitt River.

The extensive plains and valleys of this region have an elevation of from three to five thousand feet, and consequently a climate quite different from that of the other settled portions of California. The winters are cold and snowy, and the thermometer often falls many degrees below zero.

The Sierra Nevada Range terminates on the north in Plumas County, where the old rocks, of which it is composed, disappear under the lavas of the volcanic plateau. The range of mountains which extends northerly, and apparently continuous with it, is a part of the Cascade Range, so prominent in Oregon and Washington. The southern peak of the Cascade Range, then, is Lassen Peak. It is, next to Mount Shasta, the highest volcanic peak in California. Near by is the most interesting place in the state to study volcanic action. At Cinder Cone the last volcanic eruption took place. The remains of

trees killed by the falling volcanic ashes are still to be seen. Other extinct volcanoes rise from the high ridge extending from Lassen Peak toward Mount Shasta. The latter mountain, with its dark fringe of forest and its snow-capped summit, presents the grandest sight of any mountain in California. It is, with the exception of Mount Rainier, the highest of the great volcanoes of the Cascade Range, towering 14,380 feet above the sea.

FIG. 58.
Mount Shasta in winter.

Many mountains, some of which are small volcanic cones, dot the surface of the volcanic plateau province. It is bordered upon the east by the Warner Range, which, like the Sierra Nevada, was uplifted as a result of a fracture in the earth's crust. East of this high range lies the fertile Surprise Valley, without drainage to the ocean.

Pitt River traverses the broad plain-like valleys, cutting cañons where mountain ranges lie in the way, and finally joins the Sacramento.

Flows of lava, so recent that the soil has not yet gathered upon their surfaces, are to be seen in many places. One of the most rugged of these lava flows is known as the Modoc Lava Beds, lying close to Rhett Lake. It was in the caverns and crevices of this lava bed that the Modoc Indians, under Captain Jack, so long resisted the soldiers.

Over portions of this lava region, although the precipitation is considerable, there are no surface streams. The water sinking through the fissures of the lava forms underground streams. Sometimes in cañons, or at the edge of lava fields, these burst forth in large springs. The most remarkable stream of this kind is Fall River, in eastern Shasta County.

Valleys or basins without outlets occur over the plateau region. All were formerly occupied by lakes, but now the most of them have either dried up or have been drained by Pitt River. Goose Lake and Rhett Lake are the largest remaining lakes without outlet. The climatic conditions toward the east are like those of the Great Basin, into which the plateau region blends.

Resources. — The volcanic rocks of the plateau region are almost free from mineral deposits, and consequently there is little mining.

The western portion, between Mount Shasta and Lassen Peak, lies within the great forest belt of the Sierra Nevada-Cascade Range. Very little of this great body of timber has as yet been cut, although sawmills are at work in a number of places. Eastward the rainfall becomes less and the elevated plain-like valleys are treeless, but covered with sage-brush and grasses. In this section agriculture and stock-raising are the chief industries. Owing to the

distance from market no more grain or other agricultural products are raised than are needed for home use. However, cattle and horses, which can be driven to market at little expense, are raised in large numbers. The open valleys and low mountains afford good pasturage.

The Great Basin Province

Physiography and Climate. — The Great Basin includes (p. 5) a vast extent of country with no external drainage. The Sierra Nevada and Sierra Madre ranges separate it from the ocean on the west. The Wasatch Range of Utah bounds it upon the east, while upon the north and south it is separated by only a slight rise of land from the basins of the Columbia and Colorado rivers respectively.

This area must not be thought of as one simple basin, but as being broken up into smaller basins by many detached mountains and mountain ranges. The lowest portion of each of these smaller basins or valleys is known as a sink, for here if the rainfall upon the surrounding mountains is sufficient, the waters gather and form shallow lakes, which may last from year to year or dry up every summer. If there is little rain upon the mountains, there are no streams at all entering the sink.

A few thousand years ago the lakes were larger and more numerous, for the rainfall was then greater. Now the precipitation in the Great Basin is small and irregular. Occasionally heavy rains, called cloudbursts, occur in the mountains. The water, because there is little soil and vegetation to retain it, runs rapidly into the cañons, and then out on to the sands of the desert. These torrents carry along sand, gravel, and even huge boulders.

About one-third of the area of California lies within the Great Basin. It is an area of much interest, for it includes the highest mountains and the lowest sinks of the Great Basin. It is an area also of great mineral wealth. The precious metals are found in the mountains, and salt, soda, and borax upon the great desert valleys.

Trace out the boundaries of the Great Basin upon the relief map. Note that in the Mohave Desert the moun-

FIG. 59.

Upon the borders of the Colorado Desert.

tains are low and irregular, but that east of the Sierra Nevada there are other high ranges extending north and south parallel with the Sierra.

The first mountain range east of the Sierra Nevada is the Inyo-White Mountain Range, some peaks of which rise almost as high as the Sierra Nevada. Then comes the Panamint Range, and east of that, Death Valley, one hundred and ten feet below the level of the ocean. It is one of the hottest and most arid regions of the United

States. It is many miles broad, and people trying to cross it during the heat of summer often perish.

The Colorado Desert lies in the extreme southeastern portion of the state. It was formerly occupied by the waters of the Gulf of California, but the Colorado River built its delta southward and cut off the northern portion of this ancient gulf, thus leaving a lake. The water of the Colorado River occasionally flows into this sink, but usually it is dry and covered with a layer of salt.

Surprise Valley, in northeastern California, is occupied by two shallow lakes, which frequently dry up. South of this valley, and close under the Sierra Nevada Mountains, is Honey Lake, which has an extensive and highly cultivated valley about it. Contrasting strongly with the shallow alkaline waters of this lake are the pure, deep waters of Lake Tahoe. It is situated at an elevation of over six thousand feet, near the crest of the Sierra Nevada Mountains. The mountains on the western shore are much resorted to in summer.

FIG. 60.
Earthquake fissures near Mono Lake.

Mono Lake and the region about it are full of interest. Although five hundred feet higher than Lake Tahoe it

has no outlet, and is strongly alkaline. There has been quite recent volcanic activity there. Upon the northern shore of the lake are open earthquake fissures, while to the south there is a group of mountains known as the Mono Craters. These were formed by eruptions of lava and volcanic ashes, and exhibit remarkably perfect craters.

Owens Lake is the southernmost of the large lakes of the Great Basin. It is supplied by Owens River, which rises in the high Sierra and flows south between that range and

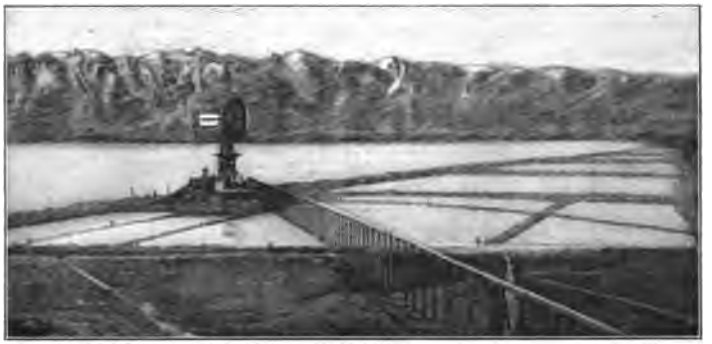


FIG. 61.
Getting soda by the evaporation of the water of Owens Lake.

the Inyo-White Mountain Range. The water of Owens Lake is so alkaline that soda in commercial quantities is obtained from it. The lake was once fresh, for during the glacial period, when the precipitation was greater, it had an outlet to the south into other great sinks, which are now dry. The bed of the old outlet is easily followed for many miles. It is used as a wagon road, and will undoubtedly sometime be occupied by a railroad.

The only stream of any size entering the Mohave Desert is the Mohave River, which after flowing one hundred

miles disappears in the sands. Occasionally, when the spring rains fall at just the right intervals, the desert is covered for a short time with a carpet of brilliant flowers, which quickly fruit, dry up, and are obliterated by the drifting sands. The vegetation of the desert has already been described (p. 19).

Mining for the Metals. — Gold is the most important mineral found in the Sierra Nevada Mountains, but in the ranges of the Great Basin silver and lead occur in abundance. The great Comstock Lode, at Virginia City, in

FIG. 62.
Bed of an ancient river. Former outlet of Owens Lake.

western Nevada, was for many years the most noted mining camp in all the west. Hundreds of millions in gold and silver were obtained there.

Bodie, near Lake Mono, is the most important mining town in eastern California. Many millions in gold have been produced there. At Randsburg, in the Mohave Desert, and near the Colorado River, are other important mines. Mineral deposits, often of great value, are found in all the mountains of the Great Basin. Mining is carried on with difficulty, because of the lack of water and

fuel. The discovery of abundance of petroleum is of great importance in the working of these mines.

Borax and Salt. — Although so desolate and apparently useless, many of the desert valleys, or sinks, contain important deposits of such minerals as borax, soda, and salt. Salt has been obtained chiefly from the Salton Basin, in the Colorado Desert. It occurs on the surface and also as a strong brine mixed with the clay underlying the sink. The salt is scraped from the surface and is taken to the drying house. The salt is so pure that it does not need further treatment, and is sacked for shipping. As fast as it is gathered, the salt keeps coming to the surface through the process called efflorescence. Evaporation causes the moisture to move upward through the clays, bringing with it the salt in solution.

In the eastern portion of the Mohave Desert are large deposits of rock salt. The valleys in which these lie were formerly connected with the water of the ocean through the Gulf of California.

One of the most important products of the deserts of California is borax. It is a valuable substance used for many purposes, but before the deposits in these deserts were discovered it was much more expensive than now. The desert basins in which the borax occurs were formerly occupied by lakes. The streams flowing into these lakes, and also springs in their bottoms, brought different salts dissolved from the rocks over or through which they flowed. In one place the predominant mineral thus brought was common salt, in another soda, in another borax. When these lakes dried up, the substances dissolved in their waters were left mixed with the clay upon the bottom. As the mud dried upon the surface,

efflorescence took place, as described in the case of the salt.

The borax, after being scraped from the desert, is dissolved in hot water and is recovered comparatively pure by evaporation. It is then transported to the nearest railroad station in great wagons, which are drawn by many spans of mules.

Agricultural Resources, Stock-raising. — Though little rain falls upon the desert and its soil is apparently of slight value, yet wherever water can be obtained it produces abundantly.

Numerous streams flow down the eastern side of the Sierra Nevada Mountains, and from Honey Lake Valley upon the north to Owens Valley upon the south, they furnish the water for irrigating many thousands of acres.

The Truckee, Carson, and Walker rivers supply the water which makes fertile many of the valleys of western Nevada. Carson Valley in particular is known as the garden spot of Nevada.

The streams entering Owens Valley furnish water for large tracts of land, which are partly devoted to orchards and partly to the raising of horses and cattle.

Character of the Population. — The population of California embraces people of many nationalities. Its attractions have appealed, not only to people in all parts of the United States, but to those of almost every foreign country.

Among the immigrants are many thousands of Chinese, who engage as laborers in nearly all the occupations. They form the least desirable class, and their further entrance has been restricted.

The early Spanish population has left a lasting impress

upon the state. We are indebted to it for many words which have come into use, and for the attractive architecture of the old mission buildings.

The Italians are mostly vineyardists and the Portuguese fishermen, although both also engage in market gardening. The Swiss are mostly dairymen.

Government and Education. — The government of California is much like that of the other states. The laws are made by the legislature, which meets every two years. There are two branches, the Senate and Assembly, and their enactments, unless passed by a two-thirds vote, must be signed by the Governor in order to become valid.

The highest tribunal for the settlement of disputes is the Supreme Court. There are also County Superior Courts, Justices' Courts, and Police Courts.

There are fifty-seven counties, each of which has its own local laws enacted by a Board of Supervisors. The large cities also have their own laws in addition to the state laws.

California has an excellent public-school system. The common schools are divided into primary and grammar grades. They are scattered throughout all portions of the state, so that almost every child is within reach of a school.

In the cities and the more thickly settled districts high schools have been established. These schools receive those who wish to go beyond the grammar school.

The next step above the high school is the State University, which completes the school system. Of equal rank also is Leland Stanford Jr. University. All these schools are free. In addition to the schools mentioned,

there are colleges and private schools in various parts of the state.

There are the five State Normal Schools, situated at San Francisco, San Jose, Los Angeles, Chico, and San Diego. The standard of the schools is continually becoming higher, and an increasing number of the teachers have had normal school or university training.

TOPICAL SUMMARY

Physiography of the Cordilleran Region

The Cordilleran region includes several great mountain systems. The Rocky Mountains lie upon the east, and the Sierra Nevada-Cascade Range upon the west. They are separated by an extended plateau region, a large part of which has no outlet to the ocean. West of the Sierra Nevada-Cascade system is a series of large valleys, separated from the Pacific Ocean by another system of mountains known as the Coast Ranges.

The Physiography of California

The three most important mountain ranges of California are the Sierra Nevada, the Coast Ranges, and the Sierra Madre, the two former enclosing the Great Valley. The mountains and valleys extend nearly parallel with the coast in a southeasterly and northwesterly direction. The Sierra Nevada and the Sierra Madre form the watershed between the Pacific slope and the Great Basin.

The surface of California is divided by nature into a number of districts or provinces, each of which has its peculiar physiography and resources.

Origin of the Mountains and Valleys of California

Two agents are changing the surface of the earth. One makes mountains by folding or fracturing the crust or through volcanic action. The other tears mountains down. It accomplishes this through disintegration of the rocks, and their erosion by running water. New mountains are steep, and have narrow valleys or cañons. Old mountains have gentle slopes and broad valleys in which streams flow slowly. California contains all these types of mountains and valleys.

Drainage

The irregular line, formed by the crest of the Sierra Nevada, the Sierra Madre, and Peninsula ranges, forms the divide between the Pacific and the interior. The main streams are upon the Pacific slope, for the rains come from the ocean. The most important river system is the San Joaquin-Sacramento, draining the Great Valley and surrounding mountains. It reaches the ocean through a depression in the Coast Ranges. The Klamath is the largest river of northern California. The streams occupying the valleys of the Coast Ranges in most cases flow northwesterly to the ocean.

Movements of the Land

The character of the coast of California has been determined by the position of the mountains and a recent subsidence of the land. Only one large river breaks through the Coast Ranges, and at the sinking of the land the ocean entered its mouth, forming the bay of San Francisco. Smaller bays were formed at the mouths of other streams. That the land was once depressed more than now is shown by the wave-cut terraces along the coast.

Islands and Submarine Plateau

The coast of California is bordered by a submarine plateau, which is narrow at the north but widens southward. From its surface rise the coast islands, which are the exposed portions of partially submerged mountains. The ocean deepens rapidly outside of the plateau.

Climate

The remarkable diversity in the climate of different portions of California is the result more of its relation to the ocean, the position and direction of the mountains, and elevation above sea level, than of its great extent of latitude.

The temperature of the coastal region is comparatively uniform, but with added distance from the coast the extremes become greater. The storms which pass over the state, coming in from the ocean, decrease in number and intensity from north to south, so that while the northwest is very wet the southeast is a desert.

Vegetation and Animal Life

Climate affects the life of both plants and animals. Changes in climate will often destroy those which cannot migrate, and permit others to take their places. The most of the larger wild animals of the state have nearly disappeared before the hunter, but laws now exist for their protection.

The coniferous forests are remarkable for the variety and size of the trees. The forests occupy a belt upon the mountain slopes, their position being determined primarily by the rainfall. They are less dense and extensive toward the south, but the western slope of the Sierra Nevada-Cascade Range, and the Coast Ranges from Santa Cruz northward, are heavily forested. Forest reserves and national parks have been established for the protection of the forests and the preservation of the water supply.

Natural Resources

The diversity of its climate and the nature of its physical features have made California noted for the variety of its products. The mountains are filled with minerals. Their slopes are covered with forests and adapted to grazing. The valleys are valuable for agriculture, and produce every variety of temperate and subtropical fruits.

History and Industrial Development

California, although discovered before the middle of the sixteenth century, long remained unsettled because of its isolation. The first settlers were the Catholic missionaries from Mexico, who planted missions in the rich valleys near the coast. Other settlers came and devoted themselves to stock-raising. Life went on quietly until 1846, when the province fell into the possession of the United States. In 1848 came the discovery of gold, and people rushed in from all parts of the world. California was soon admitted as a state. Gold-mining was, for a number of years, the chief occupation. Then the raising of cattle and sheep increased in importance, and the large valleys began to be devoted to grain. Last of all the adaptability of the country to a large variety of fruits led to fruit-growing, which now has become the leading industry.

The Sierra Nevada Province

The Sierra Nevada is the highest and most important range. The eastern slope is abrupt, the western long and gentle. Deep cañons have been eroded down these slopes, producing grand and rugged scenery. The most remarkable of these cañons is the Yosemite Valley.

The discovery of gold led to the rush of miners into these mountains, and in a few years they took out many hundred millions in gold. Placer, hydraulic, and quartz mining have been followed. The forest belt constitutes an important source of wealth, while the foot-hills are adapted to fruits and stock. The perennial streams are used for irrigation and as a source of electrical power. In the summer these mountains are much resorted to by pleasure and health seekers.

The Great Valley Province

The Great Valley includes the Sacramento and San Joaquin valleys. It is remarkable for its extent and productiveness. Stock-raising was the earliest occupation. Then the valley became a great grain field. Later it was discovered that a large variety of fruits, including oranges, could be grown to perfection. Oranges ripen earlier than in Southern California.

Settlements sprang up on the sites of Marysville, Sacramento, and Stockton, because of the advantage of these locations as distributing points for the mines. Sacramento became the state capital and chief shipping point. Redding is the centre of copper-mining, Fresno of the raisin industry, and Bakersfield of an important oil-producing district.

The Province of the Coast Ranges

The Coast Ranges lie between the Great Valley and the ocean. The valleys are noted for their agreeable climate and the variety of their products. Large numbers of cattle are raised in the foot-hills, and grain is grown in the larger valleys. Dairying is an important industry near the coast, but the one to which most attention is given is fruit-growing. The Coast Ranges are also noted for their redwood forests and their production of quicksilver.

San Francisco is the foremost city of the state and coast. It is admirably situated for commerce. About the bay are many manufacturing establishments. In the adjacent valleys are important cities and the leading institutions for higher learning.

Southern California Province

Southern California includes that part of the state south of Tehachapi. It is shut off from the other portions by mountains, but several good passes lead across them. The Sierra Madre and Peninsula ranges separate the highly cultivated valleys upon the ocean slope from the deserts. There are many fertile tracts, of which the plain of Los Angeles is the largest. The chief products are fruits, grain, honey, beans, live stock, and petroleum. The most of the citrus fruits are produced here, the centre of the industry being at Riverside. Southern California has become noted as a pleasure and health resort.

Province of the Klamath Mountains

The Klamath Mountains, although continuous with the Coast Ranges, yet, in their physiographic character and their mineral resources, resemble the Sierra Nevada Mountains. Mining and lumbering are the chief industries. The most important minerals are gold and copper.

Volcanic Plateau Province

The plateau province includes the great volcanic peaks, Shasta and Lassen. A broad forest belt stretches along the western portion, so that lumbering is the chief industry. Agriculture and stock-raising are carried on in the extensive valleys which, toward the east, blend into the Great Basin.

The Great Basin Province

This province includes one-third of the area of California. It has no outlet to the ocean, and is traversed by many mountain ranges, between which are desert valleys or sinks. Some of these are occupied by alkaline lakes. The lowest land in the United States is in the Colorado desert. The deposits of precious metals in the mountains are

of great value, while borax, salt, and soda are found in the beds of the ancient lakes. Agriculture and stock-raising are carried on where there is water for irrigation.

Mining

Mining must always be one of the leading industries of California. Gold is obtained chiefly from the older rocks of the Sierra Nevada, Klamath Mountains, and various ranges of the Great Basin. The Mother Lode is the most important mineral zone. Copper is mined most extensively in the Klamath Mountains, although there are other deposits throughout the gold belt. Petroleum and its products, such as asphaltum and bituminous rock, are found throughout the Coast Ranges, the southern portion of the San Joaquin Valley, and in Ventura, Los Angeles, and Orange counties. California is the only state producing asphaltum and bituminous rock in any great quantity.

Stock-raising

Through the increase of population and the establishment of the forest reserves the stock ranges have been much reduced in area. Stock-raising was almost the only industry of Spanish California, but reached its greatest development previous to the introduction of fruit-growing on an extensive scale. Sheep were pastured throughout all the mountains, while the cattle were raised more particularly in the Coast Ranges. Although California still produces a large amount of wool and mutton, much of the beef consumed is raised outside of the state. Tehama and Mendocino counties rank first in the production of wool.

Agriculture

Agriculture in California has been characterized by the holding of land in large tracts called ranches. These are often devoted to a single product, such as grain, for the sowing and harvesting of which the most improved machinery is used. The grains grown are chiefly wheat, barley, and oats. These are produced in all parts, but the Great Valley is the most important source. Wheat and barley are often cut for hay. Alfalfa, raised upon the moist lowlands or those that can be irrigated, is much used for hay. Grain is not usually irrigated, and in dry years the production, in many places, is light.

Irrigation is necessary for growing most vegetables and berries except upon some bottom lands. The most of these products which are shipped out of the state come from the central portion. Beans are an important crop in the southern coast counties. California is the second greatest honey-producing state. Hops are mainly grown north of San Francisco.

Irrigation

Irrigation is the artificial watering of the land. Portions of the state have a very uncertain rainfall and a semi-arid climate. These produce certain and abundant crops when irrigated. The use of water has caused a complete transformation in the appearance of Southern California, making possible the thousands of acres of orange groves. Irrigation has not been employed as much in central and northern California because of greater rainfall, but wherever it has been tried, the lands have been found to bring forth much more abundantly. Note upon the rainfall map the areas where the precipitation is twenty inches or less. These in particular need irrigation.

Fruit-raising

Fruit-raising has become the leading industry. Nearly all parts of the state are adapted to fruit of one kind or another. The greatest number of acres are planted to grapes. In the Coast Ranges the grapes are either sold fresh or made into wine. In the dry, hot valleys of the interior the raisin grape is grown. California produces practically all the raisins made in the United States.

Prunes are more widely cultivated than any other fruit. The centre of this industry is in the valleys about San Francisco Bay, particularly the Santa Clara Valley.

Peaches come next in importance. They do well in the foot-hills and higher portions of the warm valleys.

The orange is the standard fruit of Southern California. Thousands of car-loads are shipped from the state every year. The industry developed first about Riverside, but recently oranges have been found to do well along the eastern side of the Great Valley as far north as Tehama County and in Sonoma County. The number of lemon trees is much less than of orange. The lemon does not need as hot a climate.

The most of the apricots grown in the United States are produced in California.

The almond and walnut do well in nearly all the valleys of the state. The fig and olive require a warm climate to come to perfection. The olive is not found much in the United States outside of California. Apples do best in the mountains and cool valleys near the coast.

Dairying

Dairying is carried on throughout all portions of the state. The coast is, however, the leading dairy section. The conditions are especially favorable from San Luis Obispo to Humboldt Bay. The climate is cool, the grasses remain green longer than in the interior, and the coast steamers offer a convenient means of getting the products to market.

Lumbering

The forests most important for lumbering occupy a belt many miles wide along the western slope of the Sierra Nevada Mountains, the Cascade Range, and the northern Coast Ranges. The trees of importance are the Sequoia, yellow pine, sugar pine, cedar, spruce, and fir. Much of the forest area has been injured by fires and careless lumbering. Steps have been taken to secure the preservation of portions of the remaining forest.

Fisheries

The most of the streams of California are stocked with fish. Those in the Sacramento River are commercially the most valuable. The coast fisheries are important but not greatly developed.

Manufacturing

As a result of the high price of fuel and labor, manufacturing has not developed in proportion to other occupations. The transmission of electric power from the streams of the mountains and the abundance of petroleum will aid this industry. The most important manufacturing plants are located about the shores of San Francisco Bay and the Strait of Carquinez. In shipbuilding and the making of mining machinery California particularly excels.

Commerce

California, with the fine harbor of San Francisco almost in the middle of its coast line, and with valleys and waterways branching away inland from this harbor, must remain the greatest commercial centre upon the Pacific coast of the United States. Los Angeles ranks next to San Francisco as a trade centre. San Diego has a harbor which must bring to it an important foreign trade.

Winter and Health Resorts

California has become noted for its mild and healthful climate and grand scenery. Many thousands of visitors spend the winters at its chief resorts, Monterey, Santa Barbara, Pasadena, and San Diego. Through the Coast Ranges there are many medicinal springs of wide reputation. The valleys and cañons of the high Sierra Nevada offer ideal conditions for summer rest and recreation.

Suggestions

You will find in the neighborhood of your home, or within walking distance of the schoolhouse, illustrations of many geographic facts, and if you can understand them, the geography of your state and of the world will mean much more to you.

Study the action of water in shaping the physical features. Examine some stream during dry weather, and make a written description of how its bed appears. Then during or just after a rain examine it again and note the work the water is doing. You will find that it is removing particles of soil, digging little cuts and carrying the material somewhere else. What does it finally do with this material? This will lead to an understanding of how the cañons and valleys are made, as well as the alluvial bottom lands.

Find a bank and study the soil, and be able to tell what difference it shows between the top and bottom. Find a piece of crumbling rock which will sometime make soil. How does it differ from a piece of fresh rock? What made the change?

Find from observation if there is any difference in temperature between the mountain and the valley, and if elevation, amount of sunshine and rainfall affects the distribution of the plants. Study the weather before a storm and after a storm.

If your home is in a town or city, find out when people first settled there, and the reasons for their coming, what is making the place grow now, what the productions of the surrounding country are, whether trade or manufacturing is the leading occupation, and why.

If you live in the country, tell what the people are engaged in. Is the region adapted to mining or stock-raising, or agriculture or fruit-growing? Describe the location of the nearest country store and tell why it was placed where it is. What goods are imported and what raw products exported? How are they carried?

Maps and Pictures and Books

Excellent topographic maps have been prepared by the United States Geological Survey which cover a large portion of the state. These show all the features of the land and water, and location of roads and houses. On many of them the rock formations have been indicated.

There ought to be a collection of these maps in every school, and the pupils should be instructed in using them. They can be bought for five cents each at Washington. Schools near the coast should have a copy of one of the coast charts covering the region.

Photographs illustrating the physiography and the leading industries can be easily obtained. These are of the greatest importance in bringing distinctly before the pupil scenes and places which he has not visited.

Books dealing with early explorations, and life in the mines, should be at hand so that the pupils may become intelligent upon those interesting and remarkable events of the pioneer days. Stories about the origin and meaning of the striking scenery of the state would be of great value.

The following are some of the books which should be read or used for reference in connection with the study of the state:—

Two Years before the Mast, Dana.
Life of Fremont.
History of California, Royce.
The Desert, Van Dyke.
Ramona, Helen Hunt Jackson.
Stories of Our Mother Earth.
Stories of California, Sexton.
The Great Salt Lake Trail.
California and the Missions.
Stories of Rocks and Minerals, Fairbanks.
Mount Shasta, A Typical Volcano, Diller.
Mountains of California, Muir.
Our National Parks, Muir.
Pacific History Stories, Wagner.
Oregon and California, Thornton.
What I saw in California, Bryant.

General Questions

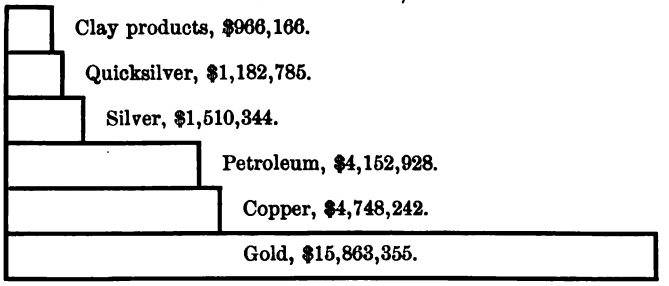
1. Describe the main features of the Cordilleran region. 2. What is meant by the Great Basin? 3. What would happen in the Great Basin if the rainfall should be greatly increased? 4. Describe the leading features of relief of California as they are shown upon the relief map. 5. Why do we study the state by provinces? 6. What are the important river systems? 7. What is the most important watershed? Describe the drainage from it. 8. California contains types of all kinds of mountains found upon the earth. What are they? 9. In what ways are valleys formed? Give examples. 10. What would be the nature of the coast line if the mountains extended at right angles to it? 11. If California should sink one thousand feet, what changes do you think would take place in its geography? Would your home be submerged by the ocean? 12. If the land should rise, how would it affect San Francisco harbor? 13. Tell something about the islands. How were they formed? 14. What are the chief things which affect the climate of California? 15. On which side of the mountain ranges does it rain the most, and why? 16. Where is the climate most uniform? 17. What part of the state receives the least rain? Why? 18. Tell about the climates which you would pass through in going in the summer from the Great Valley to the summit of the Sierra Nevada. 19. How would the vegetation change? What trees of value for lumber would you see? 20. Are the animals that we meet to-day like those living a long time ago? 21. What do you suppose caused the animals whose fossil bones we find in the gravel or soil to disappear? 22. Why do people destroy animals? What means have been taken for their preservation? 23. What is the object of establishing forest reserves? 24. Why does California have such a variety of natural resources? Mention the important ones. 25. Was California entered first from the land or from the water? Why do you suppose San Francisco Bay remained so long undiscovered? 26. What natural barriers exist between California and the other portions of America? Were these as easy to cross in the early days as now? Why? 27. Tell about the life and occupations of Californians under Mexican rule. 28. Mention the leading missions. If you have seen one, describe it. 29. When did California come under the control of the Americans? What were then the two leading towns? 30. Why did not Monterey become a city after the

American occupation? 31. How much of a town was San Francisco in 1846? 32. What led to the rapid increase of the population of California after its conquest from Mexico? 33. What led San Francisco to become the most important city of the state? 34. In what portions of the state is the most of the gold obtained? 35. Describe any kind of mining that you have seen carried on. 36. Explain the difference between placer, hydraulic, and quartz mining. 37. How did the pioneer gold seekers reach the state? What difficulties did they encounter? Mention the different trails by which they entered the state. 38. What portion of the state was occupied by the Spanish at the time of the gold discovery? Why? 39. Who introduced fruit-growing into the state? 40. What conditions made it profitable to grow fruit upon a large scale? How is it shipped away to market? 41. Why was stock-raising so profitable? 42. Tell what you know about the raising and pasturing of sheep. 43. What grains are grown in California? In what way are they mostly exported? Why? 44. In what way are people enabled to grow fruit and other products where little rain falls? 45. Tell what is meant by citrus fruits, by deciduous fruit, by viticulture. 46. If there were no high mountains how would the water supply be affected? 47. What helps to hold the water upon the slopes where it falls? Why? 48. Describe the process of irrigation. What advantage have irrigated crops over those dependent upon the rainfall? 49. What are the important fruits shipped out of the state? Where do they mostly go? 50. Why were supplies of all kinds so high priced following the discovery of gold? 51. Can you illustrate how the Sierra Nevada Mountains were formed? 52. Tell how mountains are being torn down. 53. What agency formed the most of the lakes in California? 54. Tell something about the origin of the cañons in the Sierra Nevada Mountains. 55. Watch the work of water upon a slope during a rain, and tell what it does. 56. What governs the distribution of the forests? For what are the coniferous forests of California remarkable? What is meant by coniferous? 57. What is the most important occupation in the Sierra Nevada Mountains? Mention others. Why do people go into the mountains in the summer? 58. Mention the national parks in California. Why were they established? 59. What were the causes which determined the locations of the chief cities of the Great Valley? 60. How is the water power in the mountains utilized? Why are not

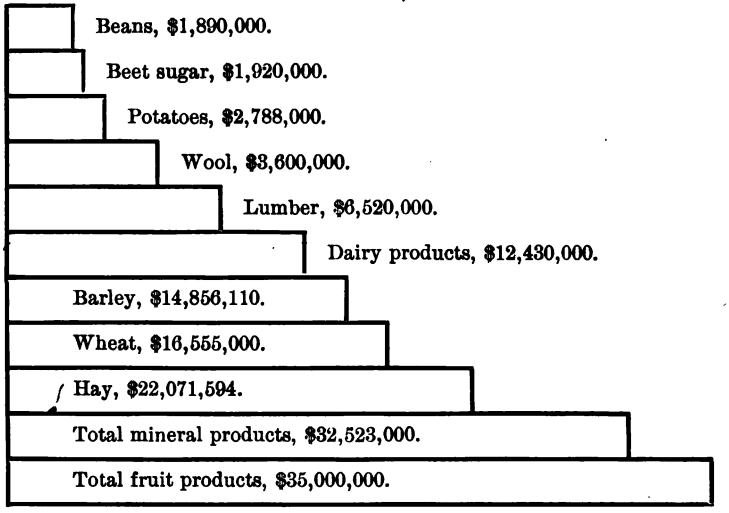
manufacturing establishments located in the mountains? 61. How does the climate of the Great Valley differ from that of the coast? Why? What part of the valley is adapted to oranges? 62. How are raisins made? What kind of climate is needed? 63. Where are most of the vegetables of the Great Valley grown? Why? 64. Where are the conditions most advantageous for dairying? Why? 65. What mineral abundant in the Coast Ranges is hardly found elsewhere in the United States? 66. Where are the great copper mines? Mention some of the uses of copper. 67. Describe the most important uses of redwood. Tell something about this tree. 68. In what manner are the logs taken to mill, and the lumber from the mills to market? 69. Why is stock-raising the most important industry of the volcanic plateau? Where is the climate of California the coldest? The hottest? Why? 70. How are volcanoes formed? What are the most important ones in California? If you have ever seen lava, describe its appearance. 71. What is pumice? Obsidian? For what was the latter used by the Indians? 72. By what mountains is Southern California shut off from the rest of the state? 73. How did the railroads cross these mountains? 74. Tell what you can about the contrast between Southern California and the Great Basin. 75. Mention some of the products and climatic conditions which have made Southern California so noted. 76. Tell what you can find out about petroleum. What products are obtained in refining it? 77. Describe the value of mountains, of waste slopes around the mountains, and of the river bottoms. 78. What is bituminous rock, and for what is it used? 79. Describe the best harbor upon the coast of Southern California. 80. What has made Los Angeles the largest city in Southern California? 81. Describe the conditions of the streams in summer in Southern California. 82. What is the difference between an ordinary well and an artesian well? 83. How were the important mountains of Southern California formed? 84. Describe the kind of climate and location best for oranges, for apples, for alfalfa, for beans. 85. In what part of California is the most honey produced? Why? 86. Why do you suppose there are so few lakes in the mountains of Southern California? 87. What is a cloudburst? What is its effect upon the mountains? Where are the lowest valleys in California? Tell about their climate. 88. What is the nature of the water of lakes without outlet? Why? 89. How are salt and soda obtained from

the waters of the lakes or sinks in California? 90. In what portions of the desert are borax and salt found? 91. What is rock salt? 92. What other minerals are found in the desert? 93. Tell what you can about the vegetation of the desert. Mention some of the important plants found there.

VALUE OF THE LEADING MINERAL PRODUCTS OF CALIFORNIA, 1900



APPROXIMATE VALUE OF THE LEADING PRODUCTS OF CALIFORNIA, 1900



POPULATION OF CALIFORNIA, 1850 TO 1900

Census Years	Population	Increase	
		Number	Per cent
1900	1,485,053	276,923	22.9
1890	1,208,130	343,436	39.7
1880	864,694	304,447	54.3
1870	560,247	180,253	47.4
1860	379,994	287,397	310.3
1850	92,597	—	—

CITIES AND TOWNS OF 2000 OR MORE PEOPLE; CENSUS OF 1900

Alameda city	16,464	Riverside city	7,973
Auburn city	1,456	Sacramento city	29,282
Bakersfield city	4,836	Salinas city	3,304
Benicia city	2,751	San Bernardino city	6,150
Berkeley town	13,214	San Diego city	17,700
Chico city	2,640	San Francisco city	342,782
Eureka city	7,327	San José city	21,500
Fresno city	12,470	San Leandro town	2,253
Grass Valley city	4,719	San Luis Obispo city	3,021
Hanford city	2,929	San Rafael city	3,879
Long Beach city	2,252	Santa Ana city	4,933
Los Angeles city	102,479	Santa Barbara city	6,587
Marysville city	3,497	Santa Clara town	3,650
Modesto city	2,024	Santa Cruz city	5,659
Napa city	4,036	Santa Monica city	3,057
Nevada city town	3,250	Santa Rosa city	6,673
Oakland city	66,960	Stockton city	17,506
Pasadena city	9,117	Tulare city	2,216
Petaluma city	3,871	Vallejo city	7,965
Pomona city	5,526	Ventura city	2,470
Red Bluff city	2,750	Visalia city	3,085
Redding city	2,946	Watsonville city	3,528
Redlands city	4,797	Woodland city	2,886

HEIGHTS OF SOME OF THE IMPORTANT MOUNTAIN PEAKS

SIERRA NEVADA AND CASCADE RANGE

Mount Whitney	14,522	Mount Goddard	13,550
" Williamson	14,448	" Ritter	13,070
" Jordan	14,275	" Lyell	13,042
Kaweah Peak	14,140	" Dana	12,992
Mount Tyndall	14,101	Pyramid Peak	10,020
" Darwin	14,100	Mount Shasta	14,380
" Brewer	13,886	Lassen Peak	10,437
" Hæckel	13,850	White Mt. Peak (Great Basin)	14,200

SOUTHERN CALIFORNIA

Grizzly Peak	11,723	Cucamonga Peak	8,529
Mount San Jacinto	10,805	Cuyamaca Peak	6,500
" San Bernardino	10,100	San Gabriel Peak	6,152
San Antonio Peak	9,935	Santiago Peak	5,682
Mount Pinos	9,214	Santa Catalina Island	2,109

COAST RANGES

Mount Linn	8,604	Mount Hamilton	4,209
Yally Bally	7,485	" Diablo	3,849
San Lucia Peak, about	5,600	" Bielowski	3,269
Mount St. Helena	4,343	Santa Ynez Mountains	3,358
" Konocti	4,246	Mount Tamalpais	2,604

KLAMATH MOUNTAINS

Thompson's Peak	9,345	Bully Choop	7,073
Mount Eddy	9,131	Mount Bally	6,246
" Scott	7,856		

THE LARGER LAKES OF CALIFORNIA

Tahoe,	Owens Lake,
Clear Lake,	Honey Lake,
Rhett Lake,	Lake Elsinore,
Goose Lake,	Donner Lake.

THE COUNTIES OF CALIFORNIA

County	Area in Sq. Miles	Population in 1900	County Seat
Alameda	737	130,197	Oakland
Alpine	835	509	Markleeville
Amador	650	11,116	Jackson
Butte	1,777	17,117	Oroville
Calaveras	1,043	11,200	San Andreas
Colusa	1,150	7,364	Colusa
Contra Costa	765	18,046	Martinez
Del Norte	1,545	2,408	Crescent City
Eldorado	1,797	8,986	Placerville
Fresno	5,940	37,862	Fresno
Glenn	1,248	5,150	Willows
Humboldt	3,507	27,104	Eureka
Inyo	10,224	4,377	Independence
Kern	8,159	16,480	Bakersfield
Kings	1,267	9,871	Hanford
Lake	1,100	6,017	Lakeport
Lassen	4,750	4,511	Susanville
Los Angeles	4,000	170,298	Los Angeles
Madera	2,100	6,364	Madera
Marin	509	15,702	San Rafael
Mariposa	1,543	4,720	Mariposa
Mendocino	3,815	20,416	Ukiah
Merced	1,967	9,215	Merced
Modoc	4,297	5,076	Alturas
Mono	2,796	2,167	Bridgeport
Monterey	3,452	19,380	Salinas
Napa	789	16,451	Napa City
Nevada	958	17,789	Nevada City
Orange	780	19,696	Santa Ana
Placer	1,386	15,786	Auburn
Plumas	2,671	4,657	Quincy
Riverside	7,008	17,897	Riverside
Sacramento	968	45,915	Sacramento
San Benito	1,056	6,633	Hollister
San Bernardino	21,555	27,929	San Bernardino

THE COUNTIES OF CALIFORNIA (*continued*)

County	Area in Sq. Miles	Population in 1900	County Seat
San Diego . . .	8,400	35,090	San Diego
San Francisco . .	42	342,782	San Francisco
San Joaquin . . .	1,364	35,452	Stockton
San Luis Obispo .	3,500	16,637	San Luis Obispo
San Mateo . . .	467	12,094	Redwood City
Santa Barbara . .	2,450	18,934	Santa Barbara
Santa Clara . . .	1,750	60,216	San Jose
Santa Cruz . . .	437	21,512	Santa Cruz
Shasta	3,906	17,318	Redding
Sierra	781	4,017	Downieville
Siskiyou	6,078	16,962	Yreka
Solano	911	24,143	Fairfield
Sonoma	1,562	38,480	Santa Rosa
Stanislaus . . .	1,138	9,550	Modesto
Sutter	611	5,886	Yuba City
Tehama	3,125	10,996	Red Bluff
Trinity	2,625	4,383	Weaverville
Tulare	4,935	18,375	Visalia
Tuolumne . . .	2,211	11,166	Sonora
Ventura	1,850	14,367	Ventura
Yolo	1,017	13,618	Woodland
Yuba	625	8,620	Marysville

GEOGRAPHICAL NAMES

Geographical names in California are derived mainly from three sources: Spanish, Indian, and English. In the calendar of the early missionaries each day was sacred to one of the saints, and so they named new places according to the name of the saint on whose day the places were reached or discovered.

The names of the male saints begin with san, of the female with santa. Thus we have the following names.

Key to Pronunciation: — fāte, fär, final, mē, mĕt, hėr, pīne, pĭn, firm, nōte, nŏt, fo͞od.

San Benito	sän bā-nee′to	St. Benedict
San Bernardino	" bĕr-nar-dee′no	St. Bernard
San Bruno	" brōō′no	St. Bruno
San Buenaventura	" bwā-nä-vĕn-tōō′rä	St. Bonaventure
San Carlos	" kar′loce	St. Charles
San Diego	" de-ā′go	St. James
San Francisco	" frän-sis′ko	St. Francis
San Gabriel	" gā-bre-ĕl′	St. Gabriel
San Joaquin	" wah-keen′	St. Joachim
San Jose	" ho-sā′	St. Joseph
San Juan	" hōō-än′	St. John
San Leandro	" lā-ăn′dro	St. Leander
San Lucas	" lōō′kas	St. Luke
San Luis Obispo	" lōō′ees o-bees′po	St. Louis Bishop
San Luis Rey	" lōō′ees rā	St. Louis King
San Mateo	" mä-tā′o	St. Matthew
San Miguel	" me-ghĕl′	St. Michael
San Rafael	" rä-fä′el	St. Raphael
Santa Ana	sän′tä ä′nä	St. Ann
Santa Barbara	" bar′bä-rä	St. Barbara
Santa Catalina	" kä-tä-lee′nä	St. Catherine
Santa Clara	" klä′rä	St. Clara
Santa Cruz	" krōōs	Holy Cross
Santa Inez	" e-nĕs′	St. Agnes
Santa Isabel	" e-sä-bĕl′	St. Elizabeth
Santa Lucia	" lōō-che′ä	St. Lucy
Santa Margarita	" mar-gä-ree′tä	St. Margaret
Santa Maria	" mä-ree′ä	St. Mary
Santa Paula	" pŏw′lä	St. Pauline
Santa Rosa	" rō′zà	St. Rose

Many places were named from some characteristic feature or incident: —

Agua Fria	ä′gwä free′ä	Cold water
Alameda	ä-lä-mā′dä	Poplar grove, public walk
Alcatraz	äl′kä-träs	Pelican
Almadan	äl-ma-dĕn′	The mine
Arroyo Seco	ar-ro′yo sā′ko	Dry creek
Arroyo Grande	ar-ro′yo gran′da	Large creek

Benicia	be-nish′i-ȧ	Venice
Buena Vista	bwā′nä vēs′ta	Good view
Calaveras	kal-ȧ-vā′ras	Skulls
Caliente	kä-lē-ān′te	Hot
Carquinez	kar-kee′nez	
Carpenteria	kar-pen-tȧ-ree′ä	Carpenter shop
Cazadero	caz-ä-dā′ro	Place for pursuing game
Cerritos	cer-ree′toce	Little hills
Cienega	se-ā′nā-gä	Marsh
Colorado	kol-o-rah′do	Red
Contra Costa	con′tra cos′ta	Opposite coast
Coyote	ko-yo′tā	A species of wolf
Del Norte	dĕl nor′tä	Of the north
El Dorado	el do-rah′do	Golden land
El Toro	el tō′ro	The bull
Escondido	ĕs-kon-dee′do	Hidden
Farralones	făr-rä-lon′es	Points of rock in the sea
Fresno	fres′no	Ash tree
Gabilan	gä-ve-län′	Sparrow hawk
Guadalupe	gwä-dä-loo′pā	Wolf river
La Jolla	lä ho′yah	The jewel
Lobos	lo′boce	Wolves
Los Angeles	loce an′jĕ-lĕs	The angels
Los Gatos	loce gā′tos	The cats
Los Olivos	loce ol-ē′voce	The olive trees
Manzanita	man-sa-nee′tah	Little apple
Mariposa	mar-ē-po′sah	Butterfly
Merced	mer-sād′	Mercy
Milpitas	mil-pee′tas	Meadow
Monte Diablo	mon′ta de-ä′blo	Devil mountain
Monterey	mon-tā-rā′	King's mountain or King
Pajaro	pä′hä-ro	Bird
Palo Alto	pä′lo ăl′to	Tall tree
Paraiso	pä-rä-ee′so	Paradise
Paso Robles	pä′so ro′blĕs	Oak pass
Pescadero	pes-kä-dā′ro	Fishmonger
Pinole	pe-no′lä	A fermented drink
Placer	plas′er	Gold-bearing gravel
Plaza	plä′zä	Public square
Plumas	plu′mas	Feathers

Presidio	prā-see′de-o	Garrison
Punta Arenas	pun′tä ä-rā′nas	Sandy point
Puente	poo-ĕn′tā	Bridge
Sacramento	sä-krä-men′to	The Sacrament
Salinas	sä-lee′näs	Salt Places
Sierra Nevada	sē-ĕr′ra nā-vä′dä	Snowy range
Solano	so-lä′no	East wind
Soledad	sol-ā-dad′	A desert
Sonora	so-no′rah	Zither
Tejon	tā-hon′	Badger
Tres Pinos	trĕs pee′noce	Three pines
Tulare	too-lä′rā	Place covered with tules
Ventura	ven-too′rä	Venture, risk

The following names were derived from the old Spanish families: —

Alvarado	al-vȧ-rah′do
Alviso	al-ve′zo
Arguello	ar-gwā′lo
Amador	ä-mä-dōr′
Bodega	bo-dā′gä
Castroville	käs′tro-vĭl
Chico	chee′ko
Coronado	cor-o-nah′do
Martinez	mar-tee′nĕz
Mendocino	men-do-see′no
Pacheco	pä-chā′ko
Sunol	sōōn-yōl′
Vacaville	vä′kä-vĭl
Vallejo	väl-lā′ho

The following are some of the many Indian names. The most of them are names of tribes.

Colusa	co-loo′sah	
Cuyama	kĭ-ä′mä	
Klamath	klä′math	
Inyo	in′yo	
Marin	mä-reen′	An Indian chief
Mohave	mo-hä′vā	
Mokelumne	mo-kĕl′oum-ne	
Mono	mo′no	

Petaluma	pĕt-alōō′mȧ	
Sequoia	se-quoi′ah	Name of a Cherokee chief
Shasta	shas′ta	Stone house, cave
Siskiyou	sis′ke-you	
Sonoma	so-no′mah	Valley of the moon
Soquel	so-kĕl′	
Stanislaus	stă-nis-lŏw′	An Indian chief
Suisun	soo-e′sōōn	
Tahoe	ta-hō′	
Tehachapi	te-hach′e-pă	Valley of the oaks
Temescal	tem′es-kal	A sweatbox
Tomales	to-mä′lĕs	
Tuolumne	twol′um-ne	
Yolo	yo′lo	Rush-covered marsh
Yosemite	yo-sem′i-te	
Yreka	wi-re′ka	White, Indian name of
Yuba	yu′ba	Mt. Shasta

The name Tamalpais is a compound of Indian and Spanish. Tamal was the name of a tribe of Indians and pais is the Spanish for country; hence — the country of the Tamal Indians.

The Spanish names are chiefly confined to the Coast Ranges and the southern part of the state. The names in the Sierra Nevada and Klamath Mountains and the Great Valley were mostly given after the Americans came.

Among the places named for Americans are: Stockton, Sutter, Kern, Lassen, Murphy, Angel, Carson, Downie, Weaver, Heald, Folsom, Gilroy, Hollister, Humboldt, Fremont, and others. These men were either early residents of the state or explorers.

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